Miller
The Power of Blue.

OM-187 439F April 1997
Eff. w/Serial Number KH374223

Processes

Gas Tungsten Arc (TIG) Welding

Shielded Metal Arc (Stick) Welding

Description

AC/DC CC 1 Phase

Arc Welding Power Source

CE

Econotig®

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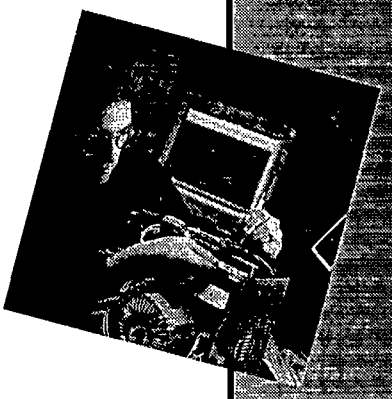
OWNER'S MANUAL

From Miller to You



Thank you and *congratulations* on choosing Miller. Now you can get the job done and get it done right. We know you don't have time to do it any other way.

That's why when Niels Miller first started building arc welders in 1929, he made sure his products offered long-lasting value and superior quality. Like you, his customers couldn't afford anything less. Miller products had to be more than the best they could be. They had to be the best you could buy.

Today, the people that build and sell Miller products continue the tradition. They're just as committed to providing equipment and service that meets the high standards of quality and value established in 1929.

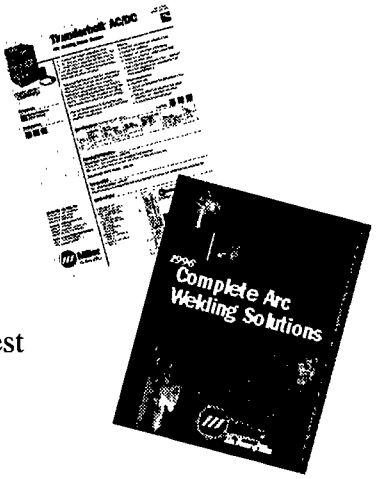
This Owner's Manual is designed to help you get the most out of your Miller products. Please take time to read the Safety precautions. They will help you protect yourself against potential hazards on the worksite. We've made installation and operation quick and easy. With Miller you can count on years of reliable service with proper maintenance. And if for some reason the unit needs repair, there's a Troubleshooting section that will help you figure out what the problem is. The parts list will then help you to decide which exact part you may need to fix the problem. Warranty and service information for your particular model are also provided.

ISO 9001 REGISTERED QUALITY SYSTEM

Miller is the first welding equipment manufacturer in the U.S.A. to be registered to the ISO 9001 Quality System Standard.

TRUE BLUE® WARRANTY

Working as hard as you do — every "power" source from Miller is backed by the most hassle-free warranty in the business.



Miller Electric manufactures a full line of welders and welding related equipment. For information on other quality Miller products, contact your local Miller distributor to receive the latest full line catalog or individual catalog sheets. To locate your nearest distributor call 1-800-4-A-Miller.

Miller
The Power of Blue

Econotig®

Description

AC/DC CC 1 Phase

Patented technology and Miller's vast experience in power source design come together in a truly affordable and effective TIG package. The Econotig® is a full-featured machine that brings you capabilities which were previously available only with heavy duty industrial TIG equipment. You get big machine performance from a sleek, compact package.

The Econotig's unique design and Miller's innovative engineering make a system that is incredibly easy to use. It's an excellent choice for novice users and hobbyists, but don't underestimate this machine's power. It has the strength and stamina to handle a wide variety of light industrial welding tasks. Yet it operates off single-phase power.

The Econotig is a complete AC/DC, TIG and Stick welding package. There are no hidden costs or extras to buy. All you need is a bottle of shielding gas and some Stick electrodes and you're ready to start welding. It's ideal for farmers, ranchers, hobbyists and moonlighters – anyone who requires the versatility to handle Stick work, plus the finesse available only from the TIG process.

In the TIG mode, the Econotig offers superior performance: 18 gauge to 3/16 in (1.2 to 4.8 mm) steel and stainless steel; 14 gauge to 3/16 in (1.8 to 4.8 mm) aluminum (see Section 5.4). For thicker metals, take advantage of the Stick mode using 3/32 and 1/8 in (2.4 and 3.2 mm) electrodes. No matter what level of skill and experience you have, the Econotig will help you be a more effective, versatile and productive welder.

Features

- AC output for superior aluminum welding
- DC output for mild and stainless steel
- Four-position polarity and range selector switch offers two AC current ranges, DC electrode (–) for TIG, and DC electrode (+) for Stick
- Patented, built-in arc assist stabilizer for AC TIG on aluminum
- Patented, built-in arc assist starter for DC TIG
- Process switch automatically sets machine for TIG or Stick
- Unique "flow-through" shielding gas TIG torch connection allows removal of torch without tools
- Preset automatic postflow timer protects tungsten tip, workpiece and torch
- Automatic high temperature shutdown

Processes

Gas Tungsten Arc (TIG) Welding

Shielded Metal Arc (Stick) Welding

The following terms are used interchangeably throughout this manual:
TIG = GTAW
Stick = SMAW

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Need fast answers to the tough welding questions? Contact your distributor. The expertise of the distributor and Miller is there to help you, every step of the way.

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Options and Accessories		
Warranty		

Miller offers a Technical Manual which provides more detailed service and parts information for your unit. To obtain a Technical Manual, contact your local distributor. Your distributor can also supply you with Welding Process Manuals such as SMAW, GTAW, GMAW, and GMAW-P.

For practical information on welding, process applications, and Miller products, visit our website at

www.millerwelds.com

Declaration of Conformity

Manufacturer's Name: Miller Electric Mfg. Co.

Manufacturer's Address: 1635 W. Spencer Street
Appleton, WI 54914 USA

Declares that the product: **ECONOTIG®**
(product name)

conforms to the following Directives and Standards:

Directives

Electromagnetic Compatibility Directives: 89/336EEC, 92/31/EEC

Low Voltage Directive: 73/23/EEC

Machinery Directives: 89/392/EEC, 91/368/EEC, 93/C 133/04, 93/68/EEC

Standards

Electromagnetic Compatibility (EMC) Product standard for arc welding equipment: EN50199: August 1995

Safety Requirements for Arc Welding Equipment part 1: EN 60974-1: 1990

Arc Welding Equipment Part 1: Welding Power Sources: IEC 974-1 (April 1995 – Draft revision)

Degrees of Protection provided by Enclosures (IP code): IEC 529: 1989

Insulation coordination for equipment within low-voltage systems: Part 1: Principles, requirements and tests: IEC 664-1: 1992

European Contact: Mr. Luigi Vacchini, Managing Director
MILLER Europe S.P.A.
Via Privata Iseo
20098 San Giuliano
Milanese, Italy

Telephone: 39(02)98290-1
Fax: 39(02)98281-552

1. Safety Precautions – Read Before Using

1.1 Symbol Usage

OM-167 439F - Date, safety_som 4/97

Means Warning! Watch Out! There are possible hazards with this procedure! The possible hazards are shown in the adjoining symbols.

▲ **Marks a special safety message.**

☞ *Means "Note"; not safety related.*

This group of symbols means Warning! Watch Out! possible ELECTRIC SHOCK, MOVING PARTS, and HOT PARTS hazards. Consult symbols and related instructions below for necessary actions to avoid the hazards.

1.2 Arc Welding Hazards

▲ **The symbols shown below are used throughout this manual to call attention to and identify possible hazards. When you see the symbol, watch out, and follow the related instructions to avoid the hazard. The safety information given below is only a summary of the more complete safety information found in the Safety Standards listed in Section 1.4. Read and follow all Safety Standards.**

▲ **Only qualified persons should install, operate, maintain, and repair this unit.**

▲ **During operation, keep everybody, especially children, away.**

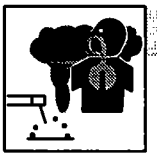
ELECTRIC SHOCK can kill.

Touching live electrical parts can cause fatal shocks or severe burns. The electrode and work circuit is electrically live whenever the output is on. The input power circuit and machine internal circuits are also live when power is on. In semiautomatic or automatic wire welding, the wire, wire reel, drive roll housing, and all metal parts touching the welding wire are electrically live. Incorrectly installed or improperly grounded equipment is a hazard.

- Do not touch live electrical parts.
- Wear dry, hole-free insulating gloves and body protection.
- Insulate yourself from work and ground using dry insulating mats or covers big enough to prevent any physical contact with the work or ground.
- Do not use AC output in damp areas, if movement is confined, or if there is a danger of falling.
- Use AC output ONLY if required for the welding process.
- If AC output is required, use remote output control if present on unit.
- Disconnect input power or stop engine before installing or servicing this equipment. Lockout/tagout input power according to OSHA 29 CFR 1910.147 (see Safety Standards).
- Properly install and ground this equipment according to its Owner's Manual and national, state, and local codes.
- Always verify the supply ground – check and be sure that input power cord ground wire is properly connected to ground terminal in disconnect box or that cord plug is connected to a properly grounded receptacle outlet.
- When making input connections, attach proper grounding conductor first – double-check connections.
- Frequently inspect input power cord for damage or bare wiring – replace cord immediately if damaged – bare wiring can kill.
- Turn off all equipment when not in use.
- Do not use worn, damaged, undersized, or poorly spliced cables.
- Do not drape cables over your body.
- If earth grounding of the workpiece is required, ground it directly with a separate cable – do not use work clamp or work cable.
- Do not touch electrode if you are in contact with the work, ground, or another electrode from a different machine.
- Use only well-maintained equipment. Repair or replace damaged parts at once. Maintain unit according to manual.
- Wear a safety harness if working above floor level.
- Keep all panels and covers securely in place.
- Clamp work cable with good metal-to-metal contact to workpiece or worktable as near the weld as practical.
- Insulate work clamp when not connected to workpiece to prevent contact with any metal object.

SIGNIFICANT DC VOLTAGE exists after removal of input power on inverters.

- Turn Off inverter, disconnect input power, and discharge input capacitors according to instructions in Maintenance Section before touching any parts.



FUMES AND GASES can be hazardous.

Welding produces fumes and gases. Breathing these fumes and gases can be hazardous to your health.

- Keep your head out of the fumes. Do not breathe the fumes.
- If inside, ventilate the area and/or use exhaust at the arc to remove welding fumes and gases.
- If ventilation is poor, use an approved air-supplied respirator.
- Read the Material Safety Data Sheets (MSDSs) and the manufacturer's instructions for metals, consumables, coatings, cleaners, and degreasers.
- Work in a confined space only if it is well ventilated, or while wearing an air-supplied respirator. Always have a trained watch-person nearby. Welding fumes and gases can displace air and lower the oxygen level causing injury or death. Be sure the breathing air is safe.
- Do not weld in locations near degreasing, cleaning, or spraying operations. The heat and rays of the arc can react with vapors to form highly toxic and irritating gases.
- Do not weld on coated metals, such as galvanized, lead, or cadmium plated steel, unless the coating is removed from the weld area, the area is well ventilated, and if necessary, while wearing an air-supplied respirator. The coatings and any metals containing these elements can give off toxic fumes if welded.

ARC RAYS can burn eyes and skin.

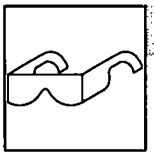
Arc rays from the welding process produce intense visible and invisible (ultraviolet and infrared) rays that can burn eyes and skin. Sparks fly off from the weld.

- Wear a welding helmet fitted with a proper shade of filter to protect your face and eyes when welding or watching (see ANSI Z49.1 and Z87.1 listed in Safety Standards).
- Wear approved safety glasses with side shields under your helmet.
- Use protective screens or barriers to protect others from flash and glare; warn others not to watch the arc.
- Wear protective clothing made from durable, flame-resistant material (leather and wool) and foot protection.

WELDING can cause fire or explosion.

Welding on closed containers, such as tanks, drums, or pipes, can cause them to blow up. Sparks can fly off from the welding arc. The flying sparks, hot workpiece, and hot equipment can cause fires and burns. Accidental contact of electrode to metal objects can cause sparks, explosion, overheating, or fire. Check and be sure the area is safe before doing any welding.

- Protect yourself and others from flying sparks and hot metal.
- Do not weld where flying sparks can strike flammable material.
- Remove all flammables within 35 ft (10.7 m) of the welding arc. If this is not possible, tightly cover them with approved covers.
- Be alert that welding sparks and hot materials from welding can easily go through small cracks and openings to adjacent areas.
- Watch for fire, and keep a fire extinguisher nearby.
- Be aware that welding on a ceiling, floor, bulkhead, or partition can cause fire on the hidden side.
- Do not weld on closed containers such as tanks, drums, or pipes, unless they are properly prepared according to AWS F4.1 (see Safety Standards).
- Connect work cable to the work as close to the welding area as practical to prevent welding current from traveling long, possibly unknown paths and causing electric shock and fire hazards.
- Do not use welder to thaw frozen pipes.
- Remove stick electrode from holder or cut off welding wire at contact tip when not in use.
- Wear oil-free protective garments such as leather gloves, heavy shirt, cuffless trousers, high shoes, and a cap.
- Remove any combustibles, such as a butane lighter or matches, from your person before doing any welding.

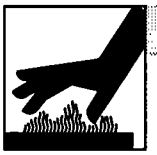


FLYING METAL can injure eyes.

- Welding, chipping, wire brushing, and grinding cause sparks and flying metal. As welds cool, they can throw off slag.
- Wear approved safety glasses with side shields even under your welding helmet.

BUILDUP OF GAS can injure or kill.

- Shut off shielding gas supply when not in use.
- Always ventilate confined spaces or use approved air-supplied respirator.



HOT PARTS can cause severe burns.

- Do not touch hot parts bare handed.
- Allow cooling period before working on gun or torch.

MAGNETIC FIELDS can affect pacemakers.

- Pacemaker wearers keep away.
- Wearers should consult their doctor before going near arc welding, gouging, or spot welding operations.

NOISE can damage hearing.

Noise from some processes or equipment can damage hearing.

- Wear approved ear protection if noise level is high.

CYLINDERS can explode if damaged.

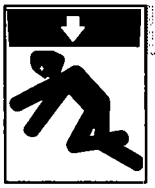
Shielding gas cylinders contain gas under high pressure. If damaged, a cylinder can explode. Since gas cylinders are normally part of the welding process, be sure to treat them carefully.

- Protect compressed gas cylinders from excessive heat, mechanical shocks, slag, open flames, sparks, and arcs.
- Install cylinders in an upright position by securing to a stationary support or cylinder rack to prevent falling or tipping.
- Keep cylinders away from any welding or other electrical circuits.
- Never drape a welding torch over a gas cylinder.
- Never allow a welding electrode to touch any cylinder.
- Never weld on a pressurized cylinder – explosion will result.
- Use only correct shielding gas cylinders, regulators, hoses, and fittings designed for the specific application; maintain them and associated parts in good condition.
- Turn face away from valve outlet when opening cylinder valve.
- Keep protective cap in place over valve except when cylinder is in use or connected for use.
- Read and follow instructions on compressed gas cylinders, associated equipment, and CGA publication P-1 listed in Safety Standards.

1.3 Additional Symbols for Installation, Operation, and Maintenance

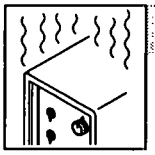
FIRE OR EXPLOSION hazard.

- Do not install or place unit on, over, or near combustible surfaces.
- Do not install unit near flammables.
- Do not overload building wiring – be sure power supply system is properly sized, rated, and protected to handle this unit.



FALLING UNIT can cause injury.

- Use lifting eye to lift unit only, NOT running gear, gas cylinders, or any other accessories.
- Use equipment of adequate capacity to lift and support unit.
- If using lift forks to move unit, be sure forks are long enough to extend beyond opposite side of unit.



OVERUSE can cause OVERHEATING

- Allow cooling period; follow rated duty cycle.
- Reduce current or reduce duty cycle before starting to weld again.
- Do not block or filter airflow to unit.

STATIC (ESD) can damage PC boards.

- Put on grounded wrist strap BEFORE handling boards or parts.
- Use proper static-proof bags and boxes to store, move, or ship PC boards.

MOVING PARTS can cause injury.

- Keep away from moving parts.
- Keep away from pinch points such as drive rolls.

WELDING WIRE can cause injury.

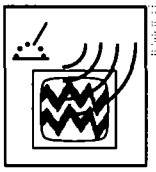
- Do not press gun trigger until instructed to do so.
- Do not point gun toward any part of the body, other people, or any metal when threading welding wire.

MOVING PARTS can cause injury.

- Keep away from moving parts such as fans.
- Keep all doors, panels, covers, and guards closed and securely in place.

H.F. RADIATION can cause interference.

- High-frequency (H.F.) can interfere with radio navigation, safety services, computers, and communications equipment.
- Have only qualified persons familiar with electronic equipment perform this installation.
- The user is responsible for having a qualified electrician promptly correct any interference problem resulting from the installation.
- If notified by the FCC about interference, stop using the equipment at once.
- Have the installation regularly checked and maintained.
- Keep high-frequency source doors and panels tightly shut, keep spark gaps at correct setting, and use grounding and shielding to minimize the possibility of interference.



ARC WELDING can cause interference.

- Electromagnetic energy can interfere with sensitive electronic equipment such as computers and computer-driven equipment such as robots.
- Be sure all equipment in the welding area is electromagnetically compatible.
- To reduce possible interference, keep weld cables as short as possible, close together, and down low, such as on the floor.
- Locate welding operation 100 meters from any sensitive electronic equipment.
- Be sure this welding machine is installed and grounded according to this manual.
- If interference still occurs, the user must take extra measures such as moving the welding machine, using shielded cables, using line filters, or shielding the work area.

1.4 Principal Safety Standards

Safety in Welding and Cutting, ANSI Standard Z49.1, from American Welding Society, 550 N.W. LeJeune Rd, Miami FL 33126

Safety and Health Standards, OSHA 29 CFR 1910, from Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

Recommended Safe Practices for the Preparation for Welding and Cutting of Containers That Have Held Hazardous Substances, American Welding Society Standard AWS F4.1, from American Welding Society, 550 N.W. LeJeune Rd, Miami, FL 33126

National Electrical Code, NFPA Standard 70, from National Fire Protection Association, Batterymarch Park, Quincy, MA 02269.

Safe Handling of Compressed Gases in Cylinders, CGA Pamphlet P-1, from Compressed Gas Association, 1235 Jefferson Davis Highway, Suite 501, Arlington, VA 22202.

Code for Safety in Welding and Cutting, CSA Standard W117.2, from Canadian Standards Association, Standards Sales, 178 Rexdale Boulevard, Rexdale, Ontario, Canada M9W 1R3.

Safe Practices For Occupation And Educational Eye And Face Protection, ANSI Standard Z87.1, from American National Standards Institute, 1430 Broadway, New York, NY 10018.

Cutting And Welding Processes, NFPA Standard 51B, from National Fire Protection Association, Batterymarch Park, Quincy, MA 02269.

1.5 EMF Information

Considerations About Welding And The Effects Of Low Frequency Electric And Magnetic Fields

The following is a quotation from the General Conclusions Section of the U.S. Congress, Office of Technology Assessment, *Biological Effects of Power Frequency Electric & Magnetic Fields – Background Paper*, OTA-BP-E-53 (Washington, DC: U.S. Government Printing Office, May 1989): ". . . there is now a very large volume of scientific findings based on experiments at the cellular level and from studies with animals and people which clearly establish that low frequency magnetic fields can interact with, and produce changes in, biological systems. While most of this work is of very high quality, the results are complex. Current scientific understanding does not yet allow us to interpret the evidence in a single coherent framework. Even more frustrating, it does not yet allow us to draw definite conclusions about questions of possible risk or to offer clear science-based advice on strategies to minimize or avoid potential risks."

To reduce magnetic fields in the workplace, use the following procedures:

1. Keep cables close together by twisting or taping them.
2. Arrange cables to one side and away from the operator.
3. Do not coil or drape cables around the body.
4. Keep welding power source and cables as far away from operator as practical.
5. Connect work clamp to workpiece as close to the weld as possible.

About Pacemakers:

The above procedures are also recommended for pacemaker wearers. Consult your doctor for complete information.

1. Consignes de sécurité – lire avant utilisation

1.1 Signification des symboles

Signifie Mise en garde ! Soyez vigilant ! Cette procédure présente des risques de danger ! Ceux-ci sont identifiés par des symboles adjacents aux directives.

Ce groupe de symboles signifie Mise en garde ! Soyez vigilant ! Il y a des risques de danger reliés aux CHOCS ÉLECTRIQUES, aux PIÈCES EN MOUVEMENT et aux PIÈCES CHAUDES. Reportez-vous aux symboles et aux directives ci-dessous afin de connaître les mesures à prendre pour éviter tout danger.

▲ **Identifie un message de sécurité particulier.**

☞ *Signifie NOTA ; n'est pas relatif à la sécurité.*

1.2 Dangers relatifs au soudage à l'arc

▲ **Les symboles présentés ci-après sont utilisés tout au long du présent manuel pour attirer votre attention et identifier les risques de danger. Lorsque vous voyez un symbole, soyez vigilant et suivez les directives mentionnées afin d'éviter tout danger. Les consignes de sécurité présentées ci-après ne font que résumer l'information contenue dans les normes de sécurité énumérées à la section 1-5. Veuillez lire et respecter toutes ces normes de sécurité.**

▲ **L'installation, l'utilisation, l'entretien et les réparations ne doivent être confiés qu'à des personnes qualifiées.**

▲ **Au cours de l'utilisation, tenir toute personne à l'écart et plus particulièrement les enfants.**

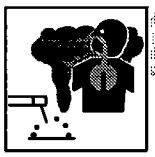
UN CHOC ÉLECTRIQUE peut tuer.

Un simple contact avec des pièces électriques peut provoquer une électrocution ou des blessures graves. L'électrode et le circuit de soudage sont sous tension dès que l'appareil est sur ON. Le circuit d'entrée et les circuits internes de l'appareil sont également sous tension à ce moment-là. En soudage semi-automatique ou automatique, le fil, le dévidoir, le logement des galets d'entraînement et les pièces métalliques en contact avec le fil de soudage sont sous tension. Des matériels mal installés ou mal mis à la terre présentent un danger.

- Ne jamais toucher les pièces électriques sous tension.
- Porter des gants et des vêtements de protection secs ne comportant pas de trous.
- S'isoler de la pièce et de la terre au moyen de tapis ou d'autres moyens isolants suffisamment grands pour empêcher le contact physique éventuel avec la pièce ou la terre.
- Ne pas se servir de source électrique àcourant électrique dans les zones humides, dans les endroits confinés ou là où on risque de tomber.
- Se servir d'une source électrique àcourant électrique UNIQUEMENT si le procédé de soudage le demande.
- Si l'utilisation d'une source électrique àcourant électrique s'avère nécessaire, se servir de la fonction de télécommande si l'appareil en est équipé.
- Couper l'alimentation ou arrêter le moteur avant de procéder à l'installation, à la réparation ou à l'entretien de l'appareil. Déverrouiller l'alimentation selon la norme OSHA 29 CFR 1910.147 (voir normes de sécurité).
- Installer et mettre à la terre correctement cet appareil conformément à son manuel d'utilisation et aux codes nationaux, provinciaux et municipaux.
- Toujours vérifier la terre du cordon d'alimentation – Vérifier et s'assurer que le fil de terre du cordon d'alimentation est bien raccordé à la borne de terre du sectionneur ou que la fiche du cordon est raccordée à une prise correctement mise à la terre.
- En effectuant les raccordements d'entrée fixer d'abord le conducteur de mise à la terre approprié et contre-vérifier les connexions.
- Vérifier fréquemment le cordon d'alimentation pour voir s'il n'est pas endommagé ou dénudé – remplacer le cordon immédiatement s'il est endommagé – un câble dénudé peut provoquer une électrocution.
- Mettre l'appareil hors tension quand on ne l'utilise pas.
- Ne pas utiliser des câbles usés, endommagés, de grosseur insuffisante ou mal épissés.
- Ne pas enrouler les câbles autour du corps.
- Si la pièce soudée doit être mise à la terre, le faire directement avec un câble distinct – ne pas utiliser le connecteur de pièce ou le câble de retour.
- Ne pas toucher l'électrode quand on est en contact avec la pièce, la terre ou une électrode provenant d'une autre machine.
- N'utiliser qu'un matériel en bon état. Réparer ou remplacer sur-le-champ les pièces endommagées. Entretenir l'appareil conformément à ce manuel.
- Porter un harnais de sécurité quand on travaille en hauteur.
- Maintenir solidement en place tous les panneaux et capots.
- Fixer le câble de retour de façon à obtenir un bon contact métal-métal avec la pièce à souder ou la table de travail, le plus près possible de la soudure.
- Ranger et isoler correctement la pince de masse après utilisation pour éviter le contact avec des objets reliés à la masse.

Il y a DU COURANT CONTINU IMPORTANT dans les convertisseurs après la suppression de l'alimentation électrique.

- Arrêter les convertisseurs, débrancher le courant électrique, et décharger les condensateurs d'alimentation selon les instructions indiquées dans la partie entretien avant de toucher les pièces.



LES FUMÉES ET LES GAZ peuvent être dangereux.

Le soudage génère des fumées et des gaz. Leur inhalation peut être dangereux pour votre santé.

- Eloigner votre tête des fumées. Ne pas respirer les fumées.
- A l'intérieur, ventiler la zone et/ou utiliser un échappement au niveau de l'arc pour l'évacuation des fumées et des gaz de soudage.
- Si la ventilation est insuffisante, utiliser un respirateur à alimentation d'air homologué.
- Lire les spécifications de sécurité des matériaux (MSDSs) et les instructions du fabricant concernant les métaux, les consommables, les revêtements, les nettoyants et les dégraisseurs.
- Travailler dans un espace fermé seulement s'il est bien ventilé ou en portant un respirateur à alimentation d'air. Demander toujours à un surveillant dûment formé de se tenir à proximité. Des fumées et des gaz de soudage peuvent déplacer l'air et abaisser le niveau d'oxygène provoquant des blessures ou des accidents mortels. S'assurer que l'air de respiration ne présente aucun danger.
- Ne pas souder dans des endroits situés à proximité d'opérations de dégraissage, de nettoyage ou de pulvérisation. La chaleur et les rayons de l'arc peuvent réagir en présence de vapeurs et former des gaz hautement toxiques et irritants.
- Ne pas souder des métaux munis d'un revêtement, tels que l'acier galvanisé, plaqué en plomb ou au cadmium à moins que le revêtement n'ait été enlevé dans la zone de soudure, que l'endroit soit bien ventilé, et si nécessaire, en portant un respirateur à alimentation d'air. Les revêtements et tous les métaux renfermant ces éléments peuvent dégager des fumées toxiques en cas de soudage.

LES RAYONS DE L'ARC peuvent provoquer des brûlures dans les yeux et sur la peau.

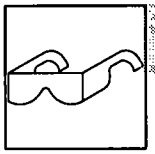
Le rayonnement de l'arc du procédé de soudage génère des rayons visibles et invisibles intenses (ultraviolets et infrarouges) susceptibles de provoquer des brûlures dans les yeux et sur la peau. Des étincelles sont projetées pendant le soudage.

- Porter un casque de soudage muni d'un écran de filtre approprié pour protéger votre visage et vos yeux pendant le soudage ou pour regarder (voir ANSI Z49.1 et Z87.1 énuméré dans les normes de sécurité).
- Porter des protections approuvés pour les oreilles si le niveau sondre est trop élevé.
- Utiliser des écrans ou des barrières pour protéger des tiers de l'éclair et de l'éblouissement; demander aux autres personnes de ne pas regarder l'arc.
- Porter des vêtements de protection constitué dans une matière durable, résistant au feu (cuir ou laine) et une protection des pieds.

LE SOUDAGE peut provoquer un incendie ou une explosion.

Le soudage effectué sur des conteneurs fermés tels que des réservoirs, tambours ou des conduites peut provoquer leur éclatement. Des étincelles peuvent être projetées de l'arc de soudure. La projection d'étincelles, des pièces chaudes et des équipements chauds peut provoquer des incendies et des brûlures. Le contact accidentel de l'électrode avec des objets métalliques peut provoquer des étincelles, une explosion, un surchauffement ou un incendie. Avant de commencer le soudage, vérifier et s'assurer que l'endroit ne présente pas de danger.

- Se protéger et d'autres personnes de la projection d'étincelles et de métal chaud.
- Ne pas souder dans un endroit là où des étincelles peuvent tomber sur des substances inflammables.
- Déplacer toutes les substances inflammables à une distance de 10,7 m de l'arc de soudage. En cas d'impossibilité les recouvrir soigneusement avec des protections homologués.
- Des étincelles et des matériaux chauds du soudage peuvent facilement passer dans d'autres zones en traversant de petites fissures et des ouvertures.
- Surveiller tout déclenchement d'incendie et tenir un extincteur à proximité.
- Le soudage effectué sur un plafond, plancher, paroi ou séparation peut déclencher un incendie de l'autre côté.
- Ne pas effectuer le soudage sur des conteneurs fermés tels que des réservoirs, tambours, ou conduites, à moins qu'ils n'aient été préparés correctement conformément à AWS F4.1 (voir les normes de sécurité).
- Brancher le câble sur la pièce le plus près possible de la zone de soudage pour éviter le transport du courant sur une longue distance par des chemins inconnus éventuels en provoquant des risques d'électrocution et d'incendie.
- Ne pas utiliser le poste de soudage pour dégeler des conduites gelées.
- En cas de non utilisation, enlever la baguette d'électrode du porte-électrode ou couper le fil à la pointe de contact.
- Porter des vêtements de protection dépourvus d'huile tels que des gants en cuir, une chemise en matériau lourd, des pantalons sans revers, des chaussures hautes et un couvre chef.
- Avant de souder, retirer toute substance combustible de vos poches telles qu'un allumeur au butane ou des allumettes.



DES PARTICULES VOLANTES peuvent blesser les yeux.

- Le soudage, l'écaillement, le passage de la pièce à la brosse en fil de fer, et le meulage génèrent des étincelles et des particules métalliques volantes. Pendant la période de refroidissement des soudures, elles risquent de projeter du laitier.
- Porter des lunettes de sécurité avec écrans latéraux ou un écran facial.

LES ACCUMULATIONS DE GAZ risquent de provoquer des blessures ou même la mort.

- Fermer l'alimentation du gaz protecteur en cas de non utilisation.
- Veiller toujours à bien aérer les espaces confinés ou se servir d'un respirateur d'adduction d'air homologué.

DES PIÈCES CHAUDES peuvent provoquer des brûlures graves.

- Ne pas toucher des parties chaudes à mains nues
- Prévoir une période de refroidissement avant d'utiliser le pistolet ou la torche.

LES CHAMPS MAGNÉTIQUES peuvent affecter les stimulateurs cardiaques.

- Porteurs de stimulateur cardiaque, restez à distance.
- Les porteurs d'un stimulateur cardiaque doivent d'abord consulter leur médecin avant de s'approcher des opérations de soudage à l'arc, de gougeage ou de soudage par points.

LE BRUIT peut affecter l'ouïe.

Le bruit des processus et des équipements peut affecter l'ouïe.

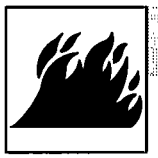
- Porter des protections approuvés pour les oreilles si le niveau sondre est trop élevé.

Si des BOUTEILLES sont endommagées, elles pourront exploser.

Des bouteilles de gaz protecteur contiennent du gaz sous haute pression. Si une bouteille est endommagée, elle peut exploser. Du fait que les bouteilles de gaz font normalement partie du procédé de soudage, les manipuler avec précaution.

- Protéger les bouteilles de gaz comprimé d'une chaleur excessive, des chocs mécaniques, du laitier, des flammes ouvertes, des étincelles et des arcs.
- Placer les bouteilles debout en les fixant dans un support stationnaire ou dans un porte-bouteilles pour les empêcher de tomber ou de se renverser.
- Tenir les bouteilles éloignées des circuits de soudage ou autres circuits électriques.
- Ne jamais placer une torche de soudage sur une bouteille à gaz.
- Une électrode de soudage ne doit jamais entrer en contact avec une bouteille.
- Ne jamais souder une bouteille pressurisée – risque d'explosion.
- Utiliser seulement des bouteilles de gaz protecteur, régulateurs, tuyaux et raccords convenables pour cette application spécifique; les maintenir ainsi que les éléments associés en bon état.
- Ne pas tenir la tête en face de la sortie en ouvrant la soupape de la bouteille.
- Maintenir le chapeau de protection sur la soupape, sauf en cas d'utilisation ou de branchement de la bouteille.
- Lire et suivre les instructions concernant les bouteilles de gaz comprimé, les équipements associés et les publications P-1 CGA énumérées dans les normes de sécurité.

1.3 Dangers supplémentaires en relation avec l'installation, le fonctionnement et la maintenance

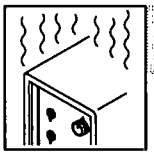


Risque D'INCENDIE OU D'EXPLOSION.

- Ne pas placer l'appareil sur, au-dessus ou à proximité de surfaces inflammables.
- Ne pas installer l'appareil à proximité de produits inflammables
- Ne pas surcharger l'installation électrique – s"assurer que l'alimentation est correctement dimensionné et protégé avant de mettre l'appareil en service.

LA CHUTE DE L'APPAREIL peut blesser.

- Utiliser l'anneau de levage uniquement pour soulever l'appareil, NON PAS les chariot, les bouteilles de gaz ou tout autre accessoire.
- Utiliser un engin d'une capacité appropriée pour soulever l'appareil.
- En utilisant des fourches de levage pour déplacer l'unité, s'assurer que les fourches sont suffisamment longues pour dépasser du côté opposé de l'appareil.



L'EMPLOI EXCESSIF peut SURCHAUFFER L'ÉQUIPEMENT.

- Prévoir une période de refroidissement, respecter le cycle opératoire nominal.
- Réduire le courant ou le cycle opératoire avant de recommancer le soudage.
- Ne pas obstruer les passages d'air du poste.

LES CHARGES ÉLECTROSTATIQUES peuvent endommager les circuits imprimés.

- Établir la connexion avec la barrette de terre avant de manipuler des cartes ou des pièces.
- Utiliser des pochettes et des boîtes antistatiques pour stocker, déplacer ou expédier des cartes de circuits imprimes.

DES ORGANES MOBILES peuvent provoquer des blessures.

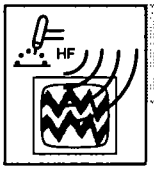
- Ne pas s'approcher des organes mobiles.
- Ne pas s'approcher des points de coincement tels que des rouleaux de commande.

LES FILS DE SOUDAGE peuvent provoquer des blessures.

- Ne pas appuyer sur la gachette avant d'en avoir reçu l'instruction.
- Ne pas diriger le pistolet vers soi, d'autres personnes ou toute pièce mécanique en engageant le fil de soudage.

DES ORGANES MOBILES peuvent provoquer des blessures.

- Rester à l'écart des organes mobiles comme le ventilateur.
- Maintenir fermés et fixement en place les portes, panneaux, recouvrements et dispositifs de protection.



LE RAYONNEMENT HAUTE FRÉQUENCE (H.F.) risque de provoquer des interférences.

- Le rayonnement haute frequence peut provoquer *des interférences avec les équipements de radio–navigation* et de communication, les services de sécurité et les ordinateurs.
- Demander seulement à des personnes qualifiées familiarisées avec des équipements électroniques de faire fonctionner l'installation.
- L'utilisateur est tenu de faire corriger rapidement par un électricien qualifié les interférences résultant de l'installation.
- Si le FCC signale des interférences, arrêter immédiatement l'appareil.
- Effectuer régulièrement le contrôle et l'entretien de l'installation.
- Maintenir soigneusement fermés les portes et les panneaux des sources de haute fréquence, maintenir les éclateurs à une distance correcte et utiliser une terre et et un blindage pour réduire les interférences éventuelles.

LE SOUDAGE À L'ARC risque de provoquer des interférences.

- L'énergie électromagnétique risque de provoquer des interférences pour l'équipement électronique sensible tel que les ordinateurs et l'équipement commandé par ordinateur tel que les robots.
- Veiller à ce que tout l'équipement de la zone de soudage soit compatible électromagnétiquement.
- Pour réduire la possibilité d'interférence, maintenir les câbles de soudage aussi courts que possible, les grouper, et les poser aussi bas que possible (ex. par terre).
- Veiller à souder à une distance de 100 mètres de tout équipement électronique sensible.
- Veiller à ce que ce poste de soudage soit posé et mis à la terre conformément à ce mode d'emploi.
- En cas d'interférences après avoir pris les mesures précédentes, il incombe à l'utilisateur de prendre des mesures supplémentaires telles que le déplacement du poste, l'utilisation de câbles blindés, l'utilisation de filtres de ligne ou la pose de protecteurs dans la zone de travail.

LES CHAMPS MAGNÉTIQUES peuvent affecter les stimulateurs cardiaques.

- Porteurs de stimulateur cardiaque, restez à distance.
- Les porteurs d'un stimulateur cardiaque doivent d'abord consulter leur médecin avant de s'approcher des opérations de soudage à l'arc, de gougeage ou de soudage par points.

1.4 Principales normes de sécurité

Safety in Welding and Cutting, norme ANSI Z49.1, de l'American Welding Society, 550 N.W. Lejeune Rd, Miami FL 33126

Safety and Health Sandards, OSHA 29 CFR 1910, du Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

Recommended Safe Practice for the Preparation for Welding and Cutting of Containers That Have Held Hazardous Substances, norme AWS F4.1, de l'American Welding Society, 550 N.W. Lejeune Rd, Miami FL 33126

National Electrical Code, NFPA Standard 70, de la National Fire Protection Association, Batterymarch Park, Quincy, MA 02269.

Safe Handling of Compressed Gases in Cylinders, CGA Pamphlet P-1, de la Compressed Gas Association, 1235 Jefferson Davis Highway, Suite 501, Arlington, VA 22202.

Règles de sécurité en soudage, coupage et procédés connexes, norme CSA W117.2, de l'Association canadienne de normalisation, vente de normes, 178 Rexdale Boulevard, Rexdale (Ontario) Canada M9W 1R3.

Safe Practices For Occupation And Educational Eye And Face Protection, norme ANSI Z87.1, de l'American National Standards Institute, 1430 Broadway, New York, NY 10018.

Cutting and Welding Processes, norme NFPA 51B, de la National Fire Protection Association, Batterymarch Park, Quincy, MA 02269.

1.5 Information sur les champs électromagnétiques

Données sur le soudage électrique et sur les effets, pour l'organisme, des champs magnétiques basse fréquence

L'extrait suivant est tiré des conclusions générales du document intitulé *Biological Effects of Power Frequency Electric & Magnetic Fields – Background Paper, OTA–BP–E–53 (Washington DC : U.S. Government Printing Office, mai 1989),* publié par le Office of Technology Assessment du Congrès américain : «... il existe maintenant d'abondantes données scientifiques compilées à la suite d'expériences sur la cellule ou d'études sur des animaux et des humains, qui montrent clairement que les champs électromagnétiques basse fréquence peuvent avoir des effets sur l'organisme et même y produire des transformations. Même s'il s'agit de travaux de très grande qualité, les résultats sont complexes. Cette démarche scientifique ne nous permet pas d'établir un tableau d'ensemble cohérent. Pire encore, elle ne nous permet pas de tirer des conclusions finales concernant les risques éventuels, ni d'offrir des conseils sur les mesures à prendre pour réduire sinon éliminer les risques éventuels». (Traduction libre)

Afin de réduire les champs électromagnétiques dans l'environnement de travail, respecter les consignes suivantes :

1 Garder les câbles ensembles en les torsadant ou en les attachant avec du ruban adhésif.

2 Mettre tous les câbles du côté opposé de l'opérateur.

3 Ne pas courber pas et ne pas entourer pas les câbles autour de vous.

4 Garder le poste de soudage et les câbles le plus loin possible de vous.

5 Relier la pince de masse le plus près possible de la zone de soudure.

Consignes relatives aux stimulateurs cardiaques :

Les consignes mentionnées précédemment font partie de celles destinées aux personnes ayant recours à un stimulateur cardiaque. Veuillez consulter votre médecin pour obtenir plus de détails.

2. Definitions

2.1 General Precautionary Label

1/96

Warning! Watch Out! There are possible hazards as shown by the symbols.

1 Electric shock from welding electrode or wiring can kill.

1.1 Wear dry insulating gloves. Do not touch electrode with bare hand. Do not wear wet or damaged gloves.

1.2 Protect yourself from electric shock by insulating yourself from work and ground.

1.3 Disconnect input plug or power before working on machine.

2 Breathing welding fumes can be hazardous to your health.

2.1 Keep your head out of the fumes.

2.2 Use forced ventilation or local exhaust to remove the fumes.

2.3 Use ventilating fan to remove fumes.

3 Welding sparks can cause explosion or fire.

3.1 Keep flammables away from welding. Do not weld near flammables.

3.2 Welding sparks can cause fires. Have a fire extinguisher nearby, and have a watchperson ready to use it.

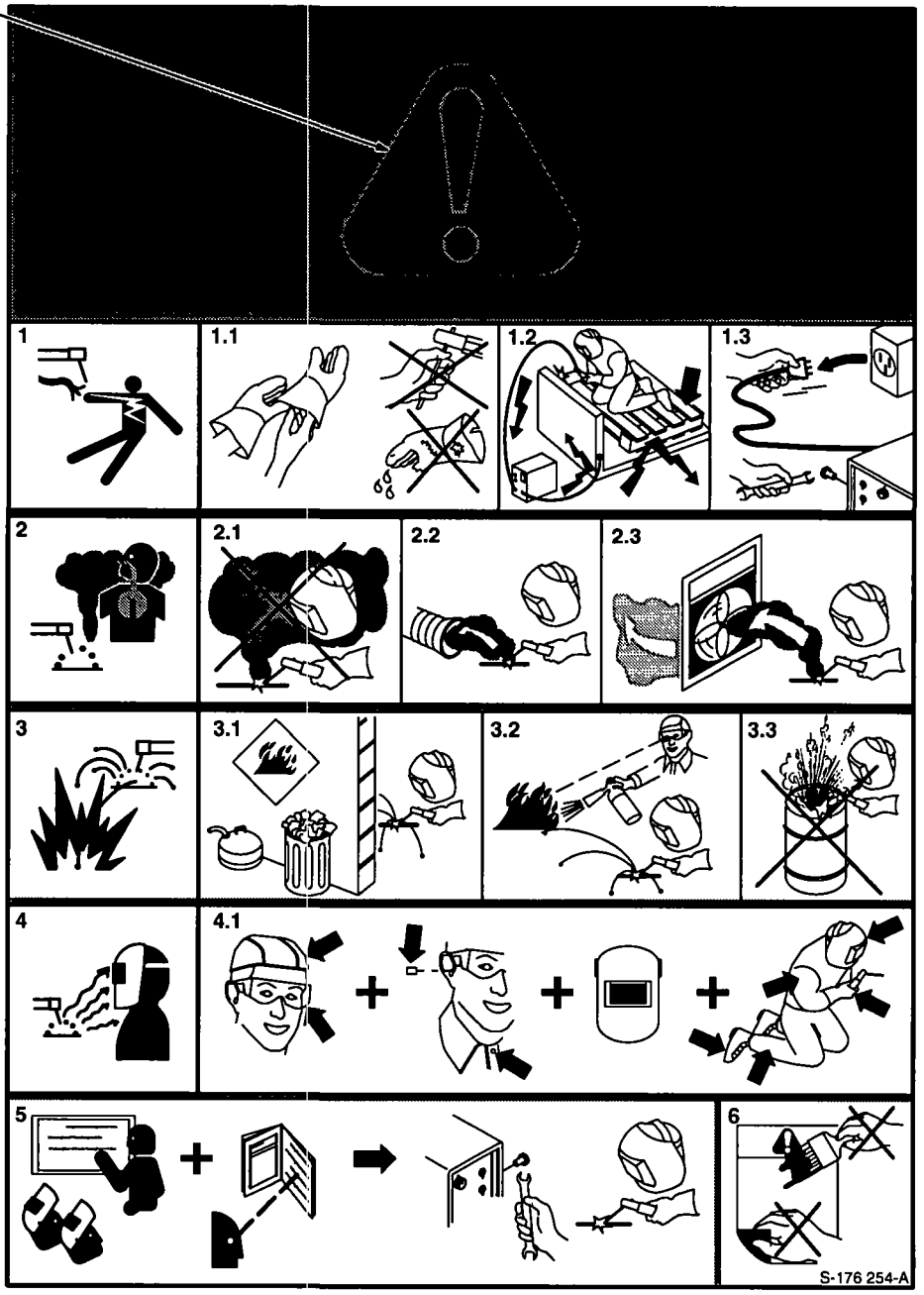
3.3 Do not weld on drums or any closed containers.

4 Arc rays can burn eyes and injure skin.

4.1 Wear hat and safety glasses. Use ear protection and button shirt collar. Use welding helmet with correct shade of filter. Wear complete body protection.

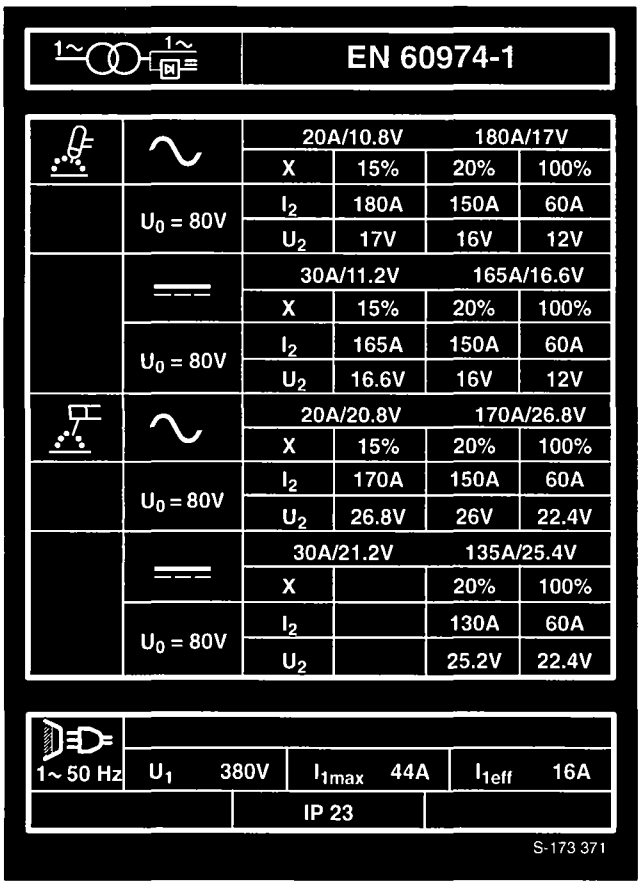
5 Become trained and read the instructions before working on the machine or welding.

6 Do not remove or paint over (cover) the label.

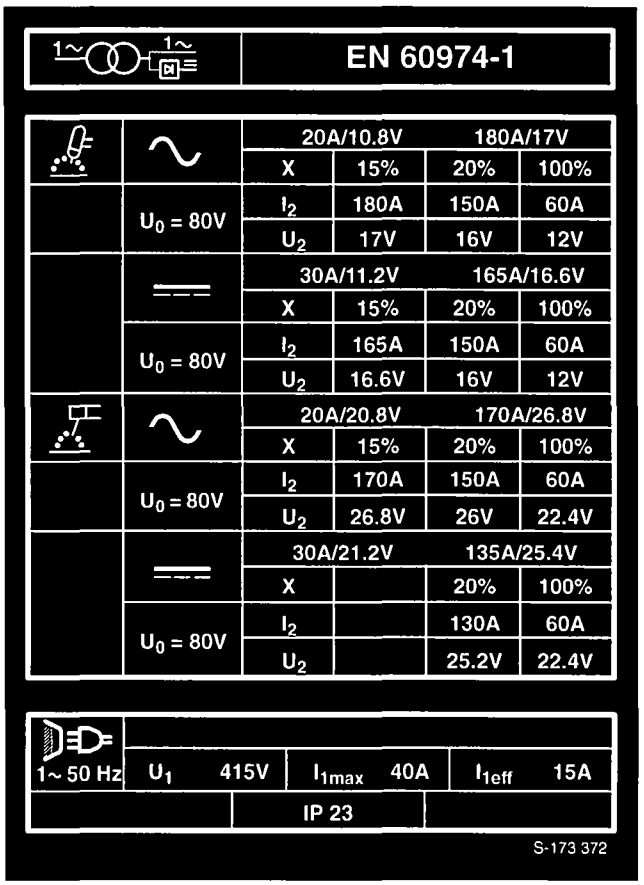


2.2 Manufacturer's Rating Labels

380 Volt Models



415 Volt Models



2.3 Symbol Definitions

	Tig Welding		Remote Foot/ Hand Control		Stick Welding		High Temperature
	Output		Alternating Current		Direct Current	I	On
+	Electrode Positive	−	Electrode Negative		Do Not Switch Under Load	V	Voltage Input
A	Amperes		Off		Electrode		Gas Out
	Amperage Control/ Panel		Work		Remote	V	Volts
U_0	Rated No Load Voltage (Average)	U_2	Conventional Load Voltage	X	Duty Cycle	I_{1eff}	Maximum Effective Supply Current
I_{1max}	Rated Maximum Supply Current	I_2	Rated Welding Current	IP	Degree Of Protection	1~	Single-Phase Combined AC/DC Power Source
%	Percent	U_1	Primary Voltage		Line Connection	Hz	Hertz

3. Introduction

3.1 Included with Your Unit

1 12 ft (3.7 m) Work Cable and Clamp

2 150 Amp TIG Torch with 12-1/2 ft (3.8 m) Cord and Flow-Through Quick-Connect (50 Hz models come with 25 ft (7.6 m) TIG Torch)

3 Electrode Holder and Quick-Connect

4 Gas Hose

5 Gas Regulator (Not included with 50 Hz models)

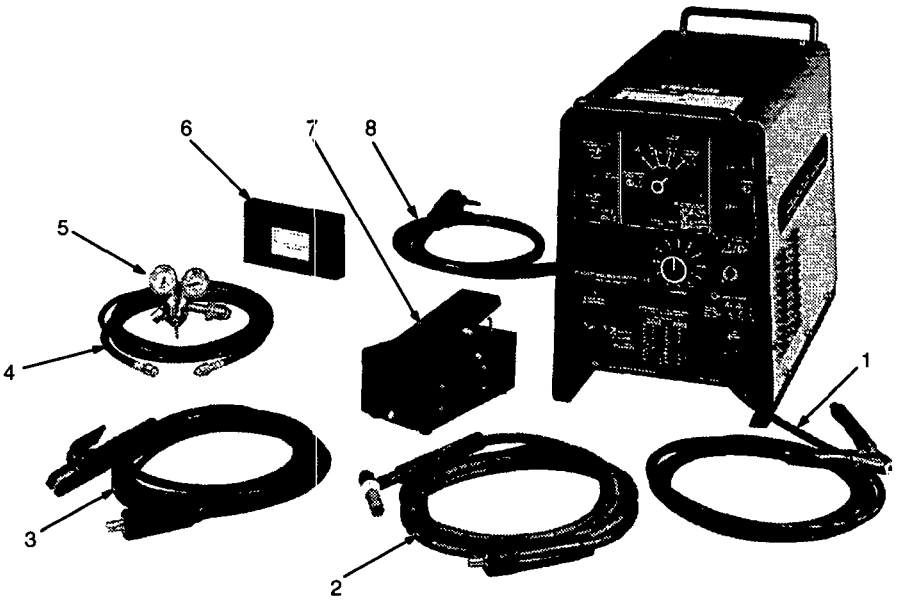
6 "How-To" Videotape

7 Foot Control with 20 ft (6 m) Cord (60 Hz models only. 50 Hz and applicable other models come with Fingertip Control instead.)

8 8 ft (2.4 m) Primary Cord (Plug supplied with 230 Volt model only)

☞ *Some assembly is required.*

For options and accessories see back of book or contact your distributor.



3.2 Specifications

Rated Output at 20% Duty Cycle	Welding Amperage Range AC High AC Low DC	Max. Open-Circuit Voltage	Rated Output	KVA	Dimensions	Net Weight
TIG: 150 A at 15 VDC (GTAW) 150 A at 15 VAC	TIG Welding A Range 50–165 20–50 30–160	78	380 V–39 A 415V–36 A	14.8 0.64*	H: 18 in (457 mm) W: 13 in (330 mm) D: 25 1/2 in (648 mm)	140 lb (64 kg)
Stick: 130 A at 25 VDC (SMAW) 150 A at 25 VAC	Stick Welding A Range 35–165 20–50 25–130	78				

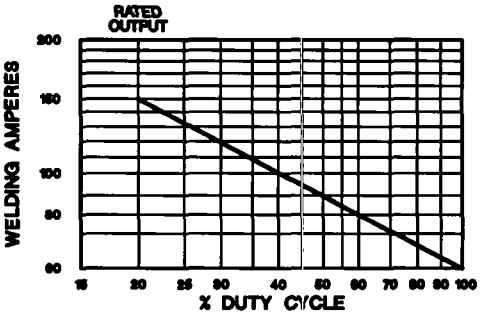
* While idling.

3.3 Duty Cycle Chart

ST-157 648-A

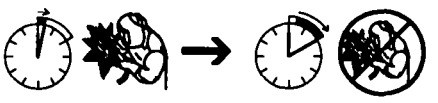
Duty cycle is percentage of 10 minutes that unit can weld at rated load without overheating.

▲ **Exceeding duty cycle can damage unit and void warranty.**



GTAW: 20% Duty Cycle at 150 A AC/DC

SMAW: 20% Duty Cycle at 130 A DC, or 150 A AC



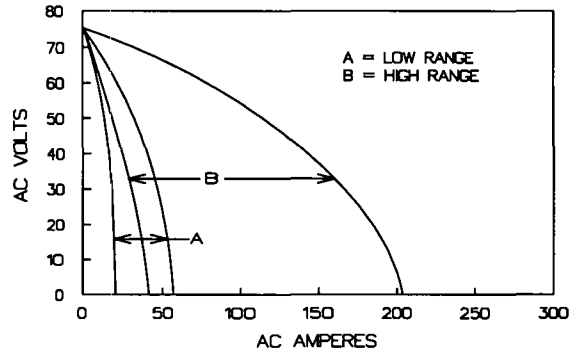
2 Minutes Welding

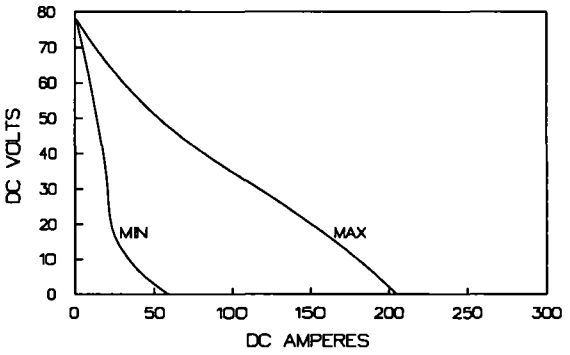
8 Minutes Resting

3.4 Volt-Ampere Curves

ssb1.1 10/91 – ST-157 625-B / ST-157 626-B

Volt-ampere curves show minimum and maximum voltage and amperage output capabilities of welding power source. Curves of other settings fall between curves shown.





4. Installation

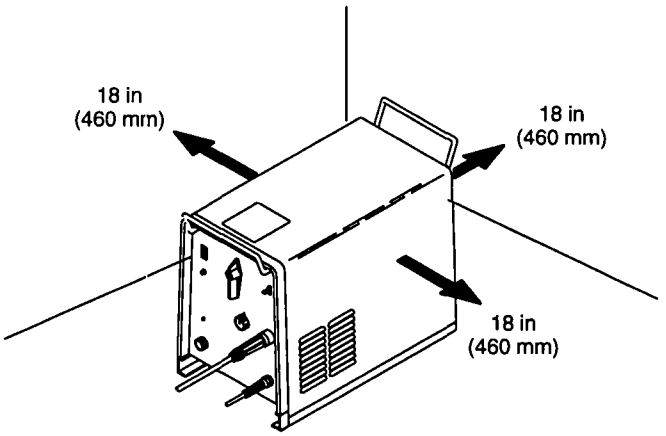
4.1 Selecting a Location

ST-158 075

Position unit so air can circulate.

For information about sources of high-frequency see Section 8.

For carts and caster kits see back of book or contact your distributor.



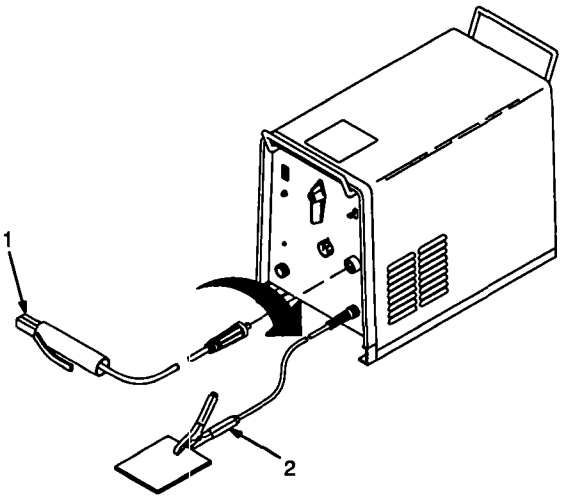
4.2 Typical Stick Connections

ST-157 858-A

1 Electrode Holder

2 Work Clamp

Connect to receptacle as shown.



4.3 Typical TIG Connections

Ref. ST-157 858-A

1 Remote Control

2 Torch

3 Work Clamp

Connect to receptacle as shown.

4 Cylinder

Chain or secure cylinder to running gear, wall, or other stationary support.

5 Cylinder Valve

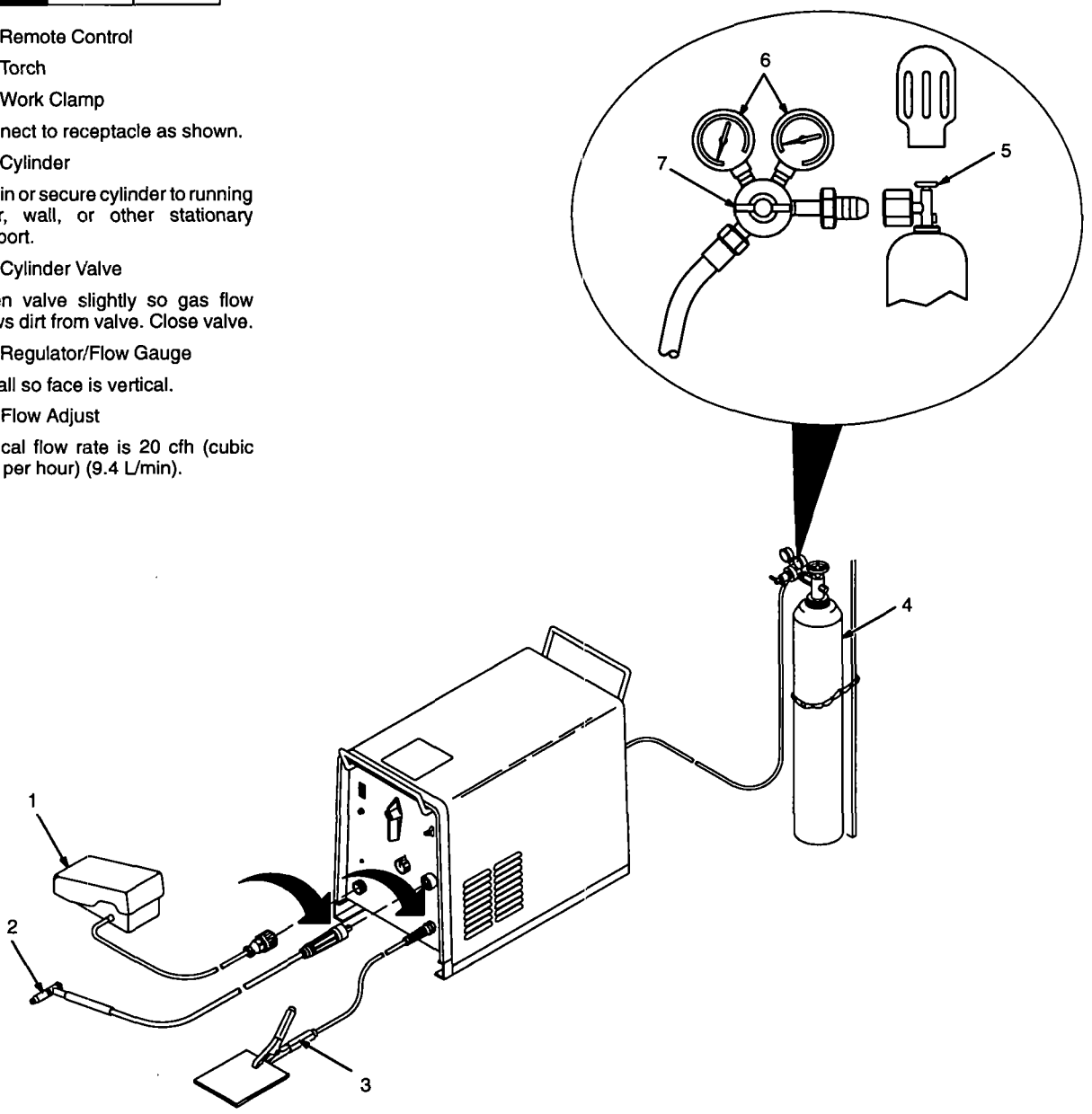
Open valve slightly so gas flow blows dirt from valve. Close valve.

6 Regulator/Flow Gauge

Install so face is vertical.

7 Flow Adjust

Typical flow rate is 20 cfh (cubic feet per hour) (9.4 L/min).



Tools Needed:

5/8, 1-1/8 in

4.4 Electrical Service Guide

S-0092J

Input Voltage	380	415
Input Amperes at Rated Output	39	36
Standard Fuse or Circuit Breaker Rating (Max. Recommended)	60 Amps	50 Amps
Input Conductor Size (Min.)	12 AWG	12 AWG
Input Conductor Length (Max. Recommended)	151 ft (46 m)	181 ft (55 m)
Grounding Conductor Size (Min.)	12 AWG	12 AWG

Reference: 1996 National Electrical Code (NEC).

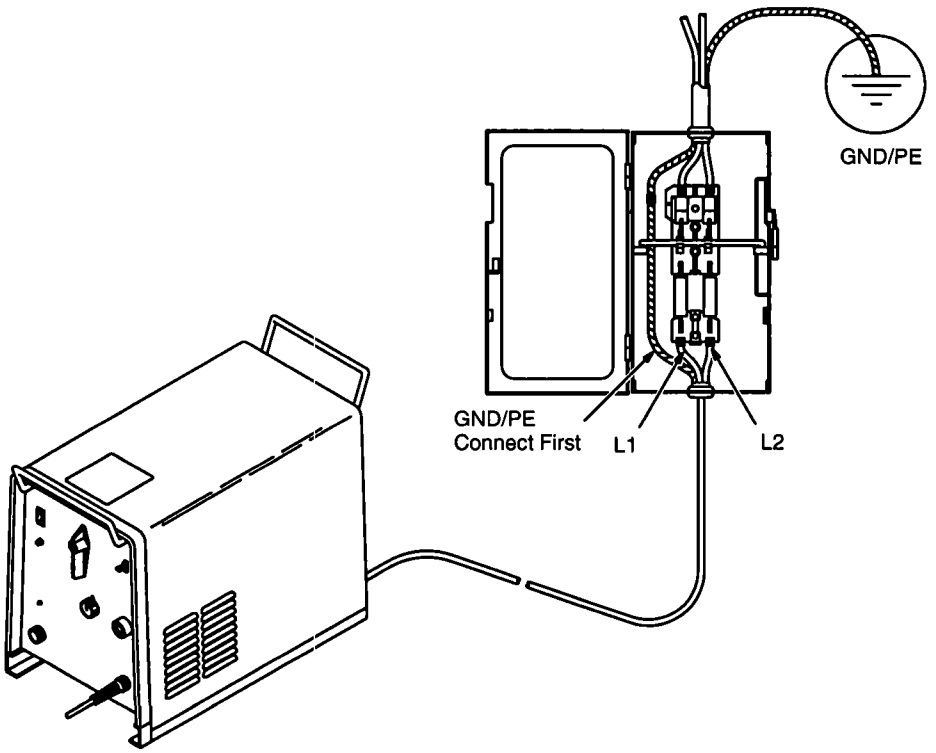
4.5 Connecting Input Power

Ref. ST-161 454-A

▲ **Have only qualified persons make this installation.**

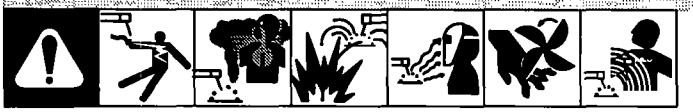
▲ **Special installation may be required where gasoline or volatile liquids are present – see NEC Article 511 or CEC Section 20.**

Units come equipped with input power cord for installation into line disconnect device. Select type and size overcurrent protection using Section 4.4.



5. Operation

5.1 Controls



Ref. ST-173 373-B

1 Weld Process Switch

Use switch to select weld process.

In Stick position (down), weld output goes On and Off with Power switch.

In GTAW (TIG) position (up), remote control device turns on and adjusts weld output of unit as limited by Amperage control. Built-in arc starter comes on when needed to start or stabilize welding arc. No adjustments needed for arc starter.

2 Pilot Light

3 Power Switch

Use switch to turn unit, fan, and pilot light On and Off.

4 Amperage Control

For Stick (SMAW), use control to adjust amperage within range selected by the Range/Polarity Switch.

5 Stick (SMAW) Table

Use table to find approximate Stick amperage output at Amperage control setting.

See Section 5.2 for example of front panel amperage control.

For remote amperage control used when TIG (GTAW) welding, front panel Amperage control setting is the maximum amperage percentage available at the remote control device.

See Section 5.3 for example of remote amperage control.

6 Range/Polarity Switch

Use switch to select range and polarity of weld output.

For Direct Current Electrode Negative (DCEN), use Electrode Negative position.

For Direct Current Electrode Positive (DCEP), use Electrode Positive position.

For alternating current (AC), use range needed for welding application – AC Low or AC High position – see Warning.

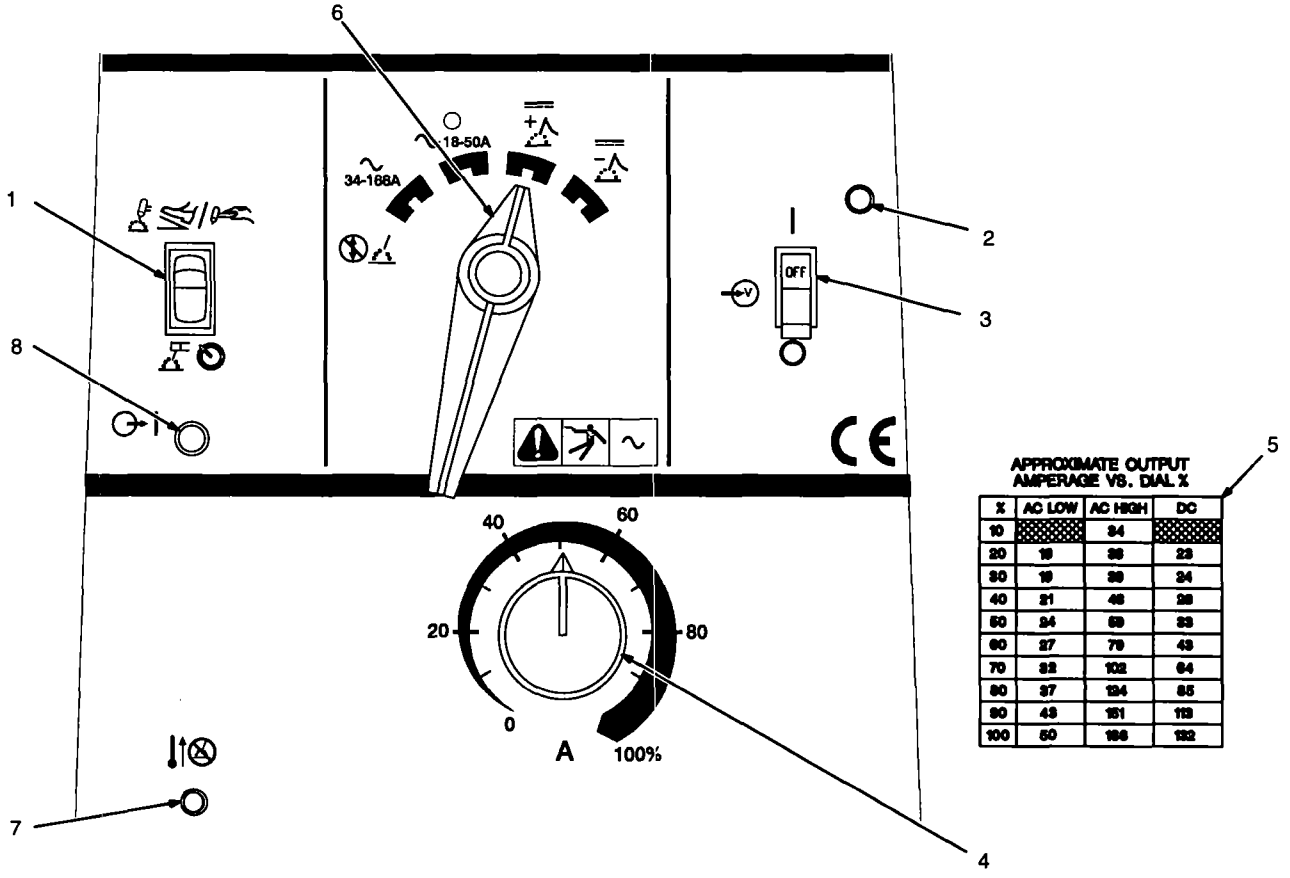
See Section 5.4 to find suggested type of weld output for application.

7 High Temperature Shutdown Light

Lights when unit overheats and shuts down (see Section 6.2).

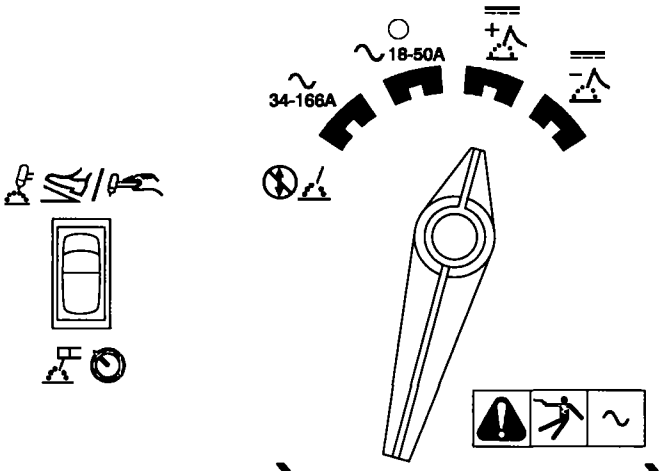
8 Output On (Contactor) Light

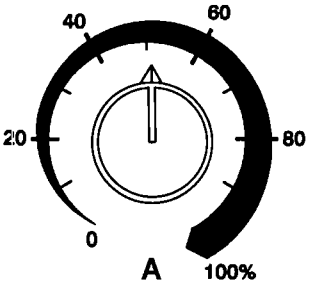
Lights when output (contactor) and unit power are on.



X	AC LOW	AC HIGH	DC
10		24	
20	19	26	23
30	19	29	24
40	21	46	28
50	24	59	33
60	27	79	43
70	32	102	64
80	37	134	85
90	43	161	113
100	50	186	132

5.2 Example of Front Panel Amperage Control





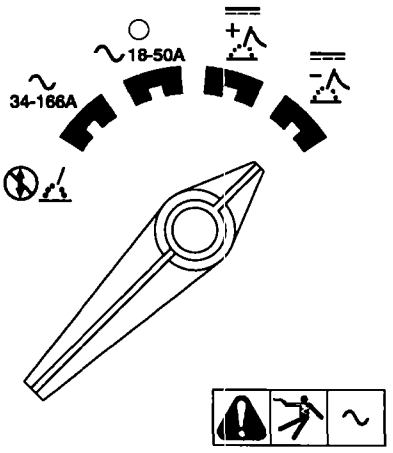
APPROXIMATE OUTPUT AMPERAGE VS. DIAL %

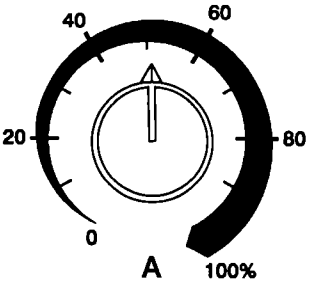
%	AC LOW	AC HIGH	DC
10		34	
20	13	36	23
30	19	39	24
40	21	46	28
50	24	69	33
60	27	79	43
70	32	102	64
80	37	124	85
90	43	151	113
100	50	166	132

In Example:
Range = DC
Percentage of Range = 50%
Weld Amperage = 33 A DC

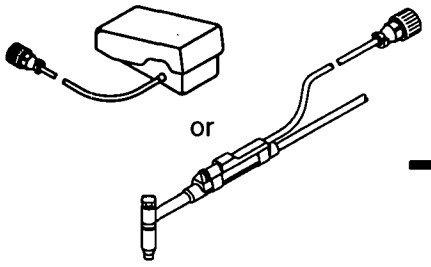
Select weld process. → Select range and polarity. → Select percentage. →

5.3 Example of Remote Amperage Control





Select weld process. → Select range and polarity. → Select percentage. →

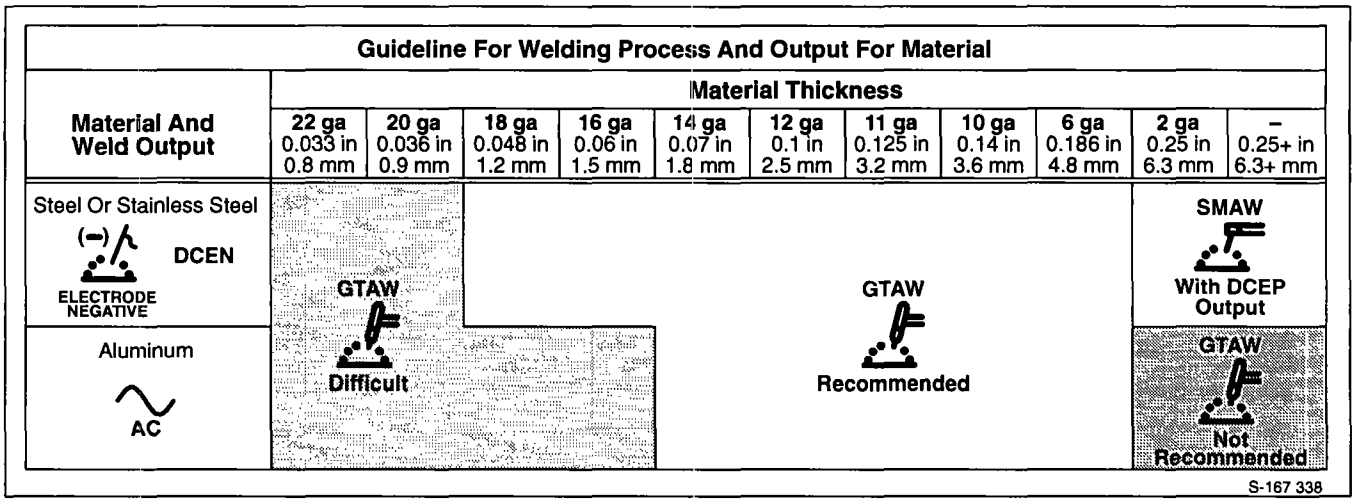


Connect remote control (see Section 4.3).

GTAW Welding Amperage Range		
AC Low	**AC High**	**DC**
20-50 A	60-165 A	30-165 A

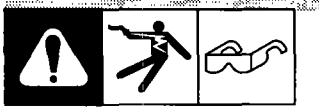
In Example:
Range = DCEN
Percentage of Range = 50%
Remote weld amperage = 30–98 A DC
(50% of 30–165 A DC)

5.4 Process and Material Thickness Guide Label



6. Maintenance and Troubleshooting

6.1 Routine Maintenance



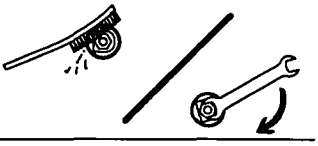
▲ **Disconnect power before maintaining.**

☞ *Maintain more often during severe conditions.*

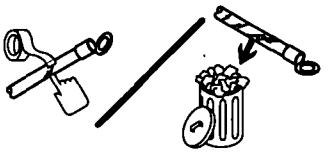
3 Months

Replace unreadable labels.

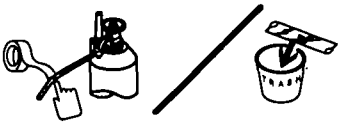
Clean and tighten weld terminals.



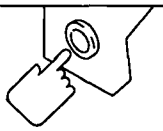
Repair or replace cracked weld cable.



Repair or replace cracked gas hose.

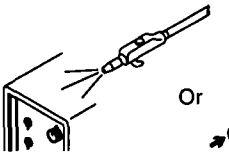


Replace o-ring in Electrode/Gas Output receptacle if cracked.



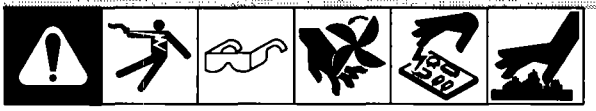
6 Months

Blow out or vacuum inside.



Or

6.2 Troubleshooting

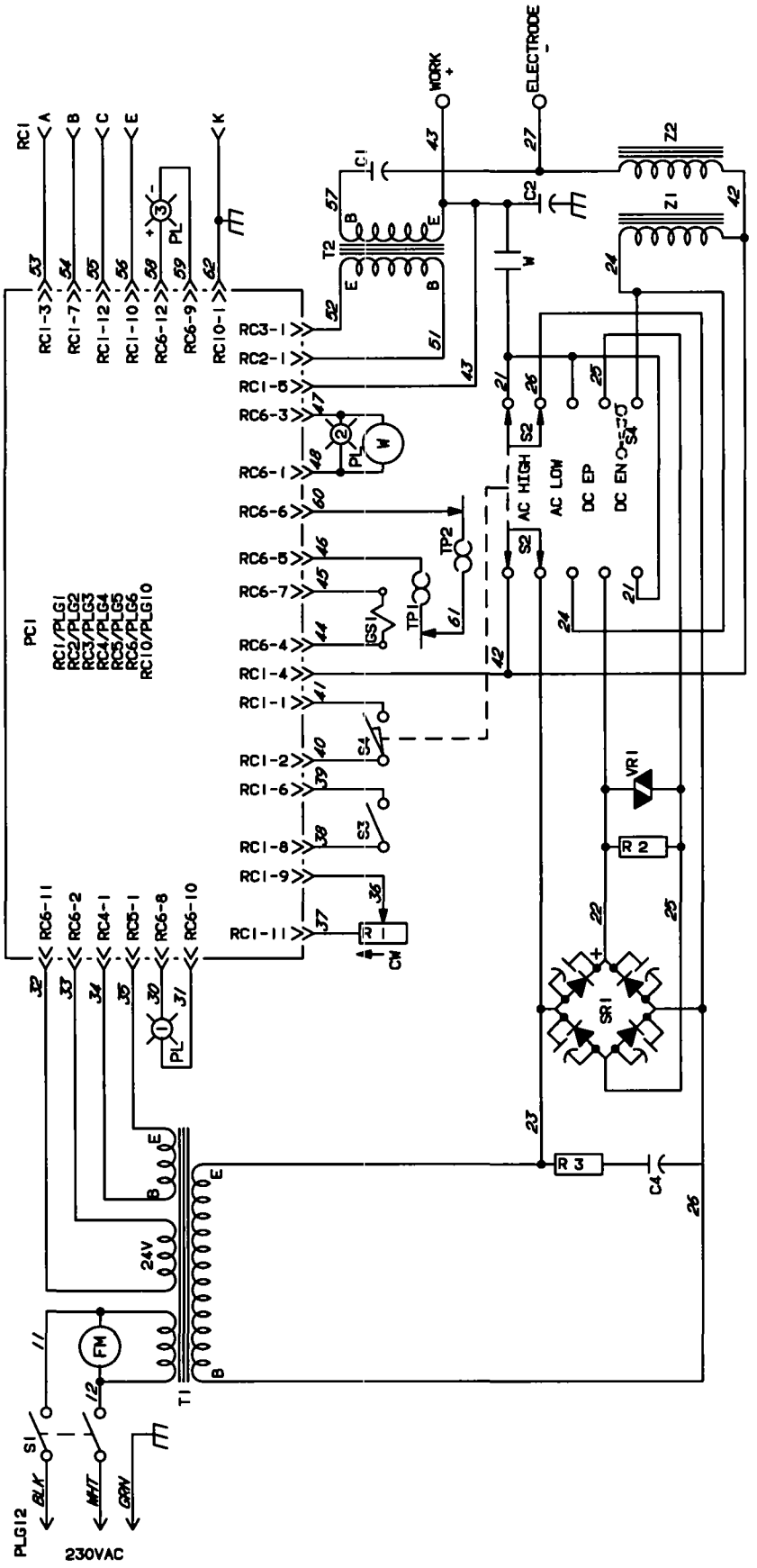


Trouble	Remedy
No weld output; fan does not run.	Place line disconnect switch in On position (see Section 4.5).
	Check and replace line fuse(s), if necessary, or reset circuit breaker (see Section 4.5).
	Check for proper input power connections (see Section 4.5).
No weld output; fan on.	Be sure Range/Polarity switch is not set between positions.
	Tighten remote control connection to Remote 14 receptacle.
	Check remote control (see remote control Owner's Manual).
	Unit overheated. Allow unit to cool (see Section 3.3).
Fan not operating; weld output available.	Check for and remove anything blocking fan movement.
	Have Factory Authorized Service Agent check fan motor.

7. Electrical Diagram

7.1 Circuit Diagram

SB-154 141-C



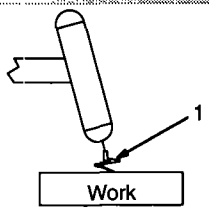
8. High Frequency

8.1 Welding Processes Requiring High Frequency

high_freq1 11/96 – S-0693

1 High-Frequency Voltage

Helps arc jump air gap between torch and workpiece and/or stabilize the arc.



TIG

8.2 Incorrect Installation

S-0694

Sources of Direct High-Frequency Radiation

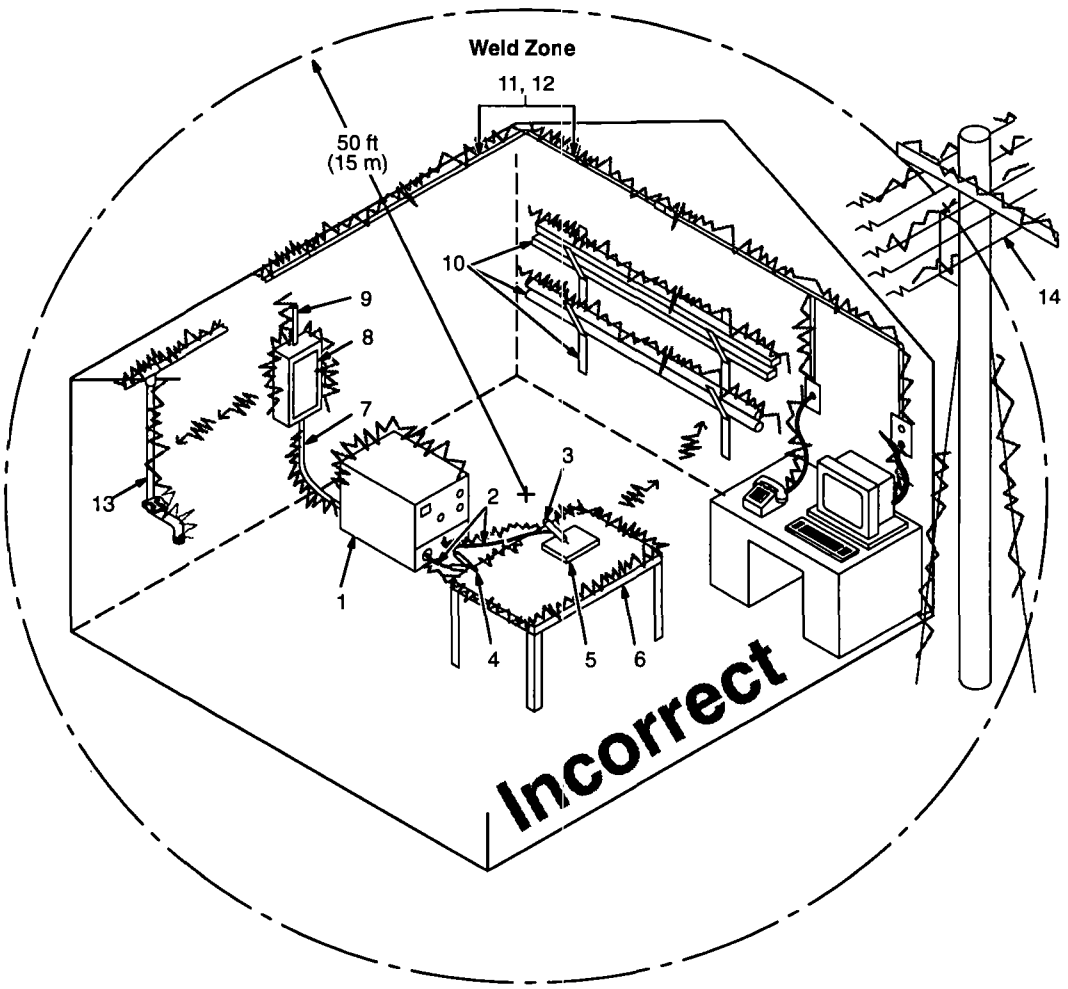
1 High-Frequency Source (welding power source with built-in HF or separate HF unit)
2 Weld Cables
3 Torch
4 Work Clamp
5 Workpiece
6 Work Table

Sources of Conduction of High Frequency

7 Input Power Cable
8 Line Disconnect Device
9 Input Supply Wiring

Sources of Reradiation of High Frequency

10 Ungrounded Metal Objects
11 Lighting
12 Wiring
13 Water Pipes and Fixtures
14 External Phone and Power Lines



8.3 Correct Installation

Ref. S-0695 / Ref. S-0695

1 High-Frequency Source (welding power source with built-in HF or separate HF unit)

Ground metal machine case, work output terminal, line disconnect device, input supply, and worktable.

2 Center Point of Welding Zone

Midpoint between high-frequency source and welding torch.

3 Welding Zone

A circle 50 ft (15 m) from center point in all directions.

4 Weld Output Cables

Keep cables short and close together.

5 Conduit Joint Bonding and Grounding

Electrically join (bond) all conduit sections using copper straps or braided wire. Ground conduit every 50 ft (15 m).

6 Water Pipes and Fixtures

Ground water pipes every 50 ft (15 m).

7 External Power or Telephone Lines

Locate high-frequency source at least 50 ft (15 m) away from power and phone lines.

8 Grounding Rod

Consult the National Electrical Code for specifications.

Metal Building Requirements

9 Metal Building Panel Bonding Methods

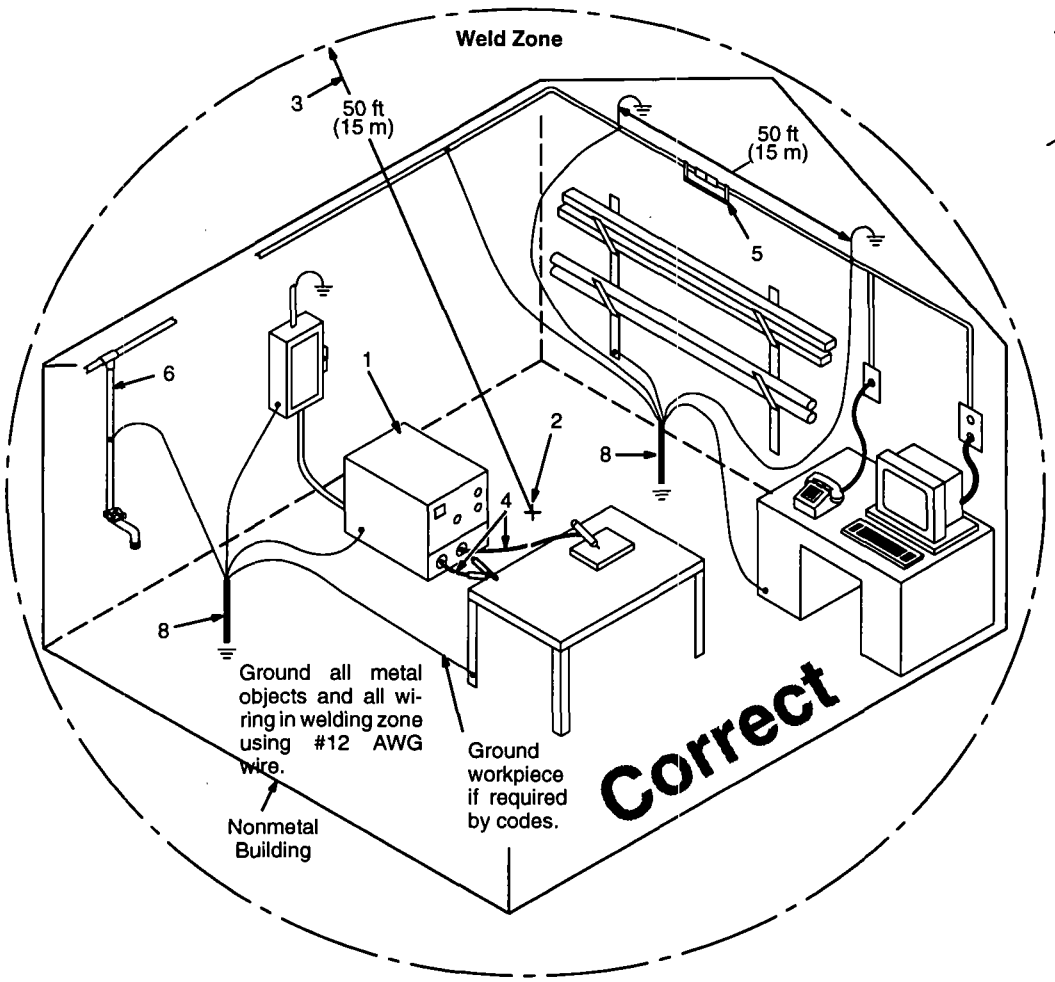
Bolt or weld building panels together, install copper straps or braided wire across seams, and ground frame.

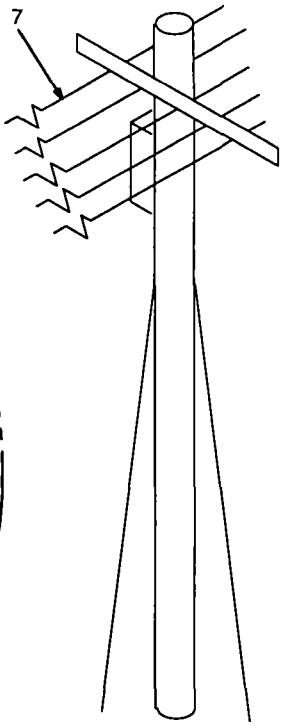
10 Windows and Doorways

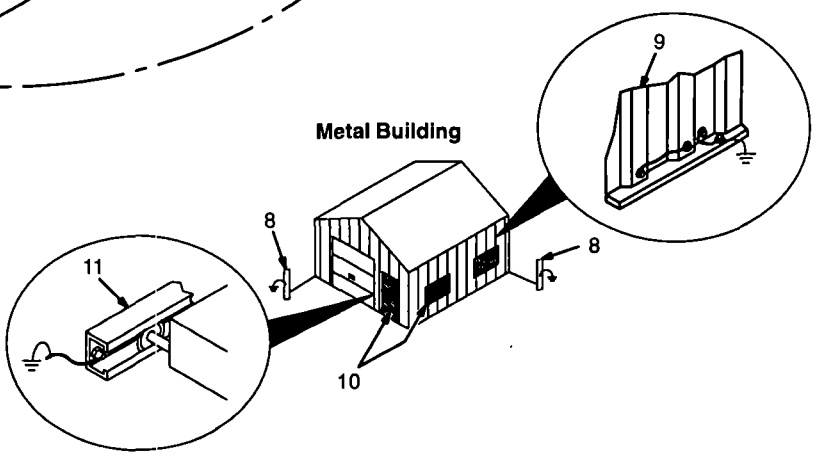
Cover all windows and doorways with grounded copper screen of not more than 1/4 in (6.4 mm) mesh.

11 Overhead Door Track

Ground the track.



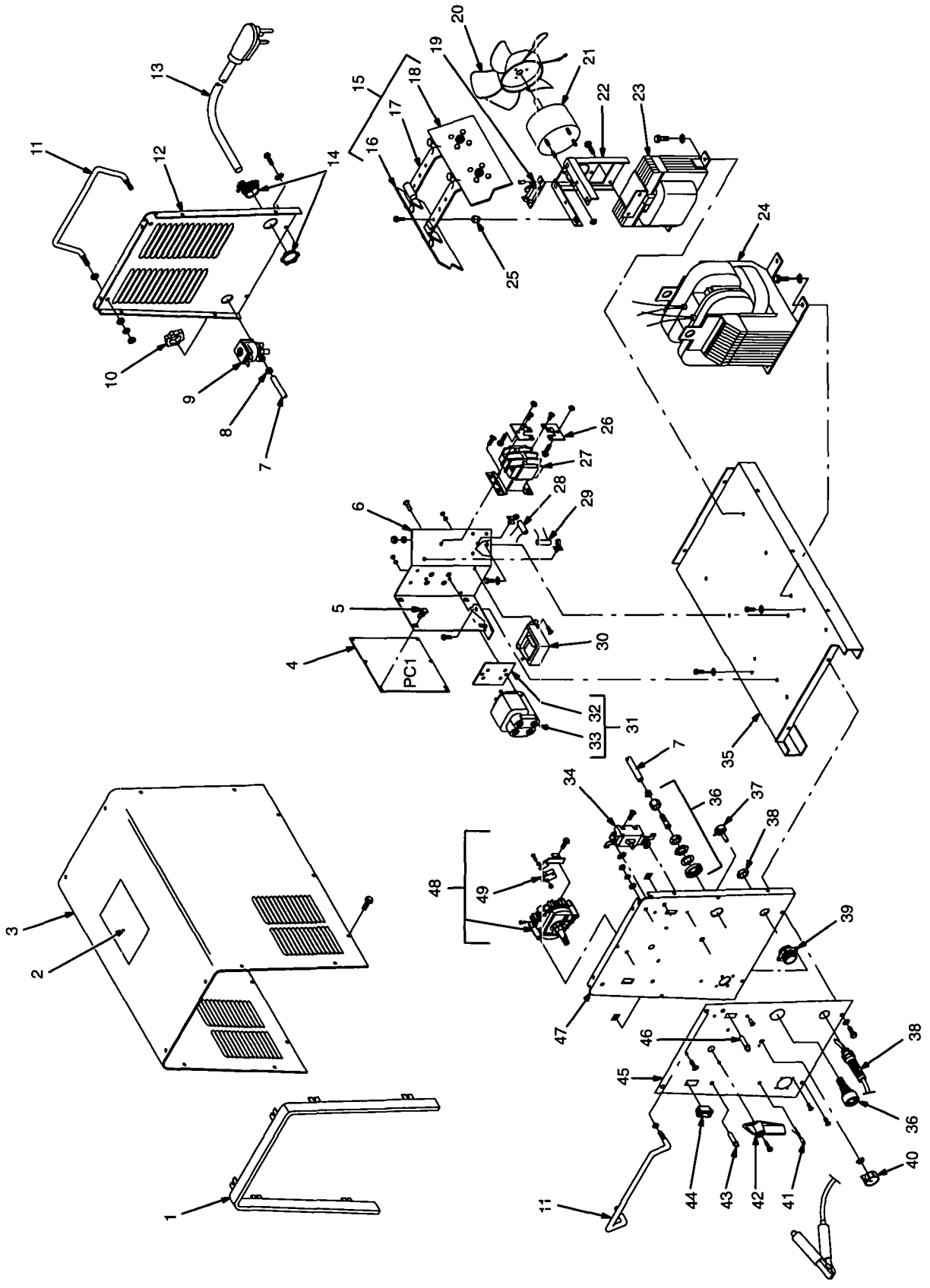




9. Parts List

9.1 Main Assembly

ST-801 399-A



Item No.	Dia. Mkgs.	Part No.	Description	Quantity
1		154 335	BEZEL, front	1
2		176 254	LABEL, warning general precautionary	1
3		+165 986	WRAPPER	1
4	PC1	186 172	CIRCUIT CARD, arc start/control (consisting of)	1
	F1	*012 658	. FUSE, mintr gl slo-blo 2A	1
	PLG1,6	130 203	CONNECTOR & SOCKETS	2
5		134 201	STAND-OFF SUPPORT, PC card .312/.375	4
6		155 404	BRACKET, mtg components	1
7		603 106	HOSE, nprn brd No. 1 (order by ft)	3ft
8		010 865	CLAMP, hose .430-.515 clp dia	2
9	GS1	125 785	VALVE, 24VAC 2 way custom port 1/8 orf	1
10		605 227	NUT, nylon hex jam .750NPST	1
11		147 571	HANDLE	2
12		155 399	PANEL, rear	1
13		605 077	CABLE, port No. 10 3/c (460V Model) (order by ft)	8ft
14		044 426	CONNECTOR, clamp cable .690/1.070	1
15	SR1	154 848	RECTIFIER, si diode (consisting of)	1
16		154 695	. RECTIFIER, straight polarity (consisting of)	1
		119 607	. DIODE, rect 35A 1000V RP	6
17		154 849	. BUS BAR, rectifier	2
	C4, R3	156 237	. CAPACITOR/RESISTOR	1
		151 880	. CAPACITOR	4
18		154 696	. RECTIFIER, reverse polarity (consisting of)	1
		119 351	. DIODE, rect 35A 1000V SP	6
19	VR1,R2	044 482	SUPPRESSOR	1
20		150 783	BLADE, fan 9 in .312 hub	1
21	FM	148 808	MOTOR, fan 230V 1550RPM .312dia shaft	1
22		155 403	BRACKET, mtg fan & rectifier	1
23	Z1	155 469	STABILIZER	1
24	T1	161 389	TRANSFORMER, pwr main 380V (consisting of)	1
24	T1	161 390	TRANSFORMER, pwr main 415V (consisting of)	1
	TP1,2	176 170	. THERMOSTAT, NC	2
25		083 147	GROMMET, screw No. 8/10 panel hole .312sq .500 high	4
26		034 260	LINK, connecting contactor terminal	2
27	W	035 519	CONTACTOR	1
28	C2	155 501	CAPACITOR	1
29	C1	155 290	CAPACITOR	1
		155 107	CABLE TIE, push mount 0-1.500 bundle	2
30	T2	157 596	TRANSFORMER, impulse HV	1
31	Z2	155 499	TRANSFORMER, blocking (consisting of)	1
32		159 102	. PLATE, mtg block transformer	1
33		155 288	. COIL, blocking	1
34	S1	124 511	SWITCH, tgl DPST 40A 600VAC	1
35		165 987	BASE	1
36	Elec	186 092	RECEPTACLE KIT, dinse	1
37	R1	035 897	POTENTIOMETER, C sltd 1T 2W 1K ohm	1
38		134 900	STRAIN RELIEF, cable flex .270-.480 cable	1
39	RC1	143 976	CONNECTOR w/SOCKETS	1
		134 734	CONNECTOR, circ 14 pin plug Amp 213571-2	
		134 731	CONNECTOR, circ pin push-in 14-18ga Amp 213603-1	
		079 739	CONNECTOR, circ clamp str rlf sz 17-20 Amp 206322-2 (or)	
		143 922	CONNECTOR, circ clamp str rlf sz 17-20 Amp 206070-3	
40		097 924	KNOB, pointer	1
41	PL3	155 500	LIGHT, indicator	1
42		148 956	HANDLE, switch	1
43	PL2	157 957	LIGHT, ind blu lens 28V snap mtg	1

9.1 (Continued)

Item No.	Dia. Mkgs.	Part No.	Description	Quantity
44	S3	155 013	SWITCH, rocker SPST 10A 250VAC	1
45			NAMEPLATE, (order by model and serial number)	1
46	PL1	157 958	LIGHT, ind wht lens 28V	1
47		155 422	PANEL, front	1
48	S2	154 896	SWITCH, polarity (consisting of)	1
49	S4	089 645	SWITCH, lim 11A 125V roller lever actr	1
		600 317	CABLE, weld/cop strd No. 4 (order by ft)	15ft
		028 594	BODY, electrode holder	1
		025 475	SPRING, cprsn .490 OD x .090 wire	1
		028 593	LEVER, clamp electrode holder	1
		128 188	HOSE, gas	1
		128 434	REGULATOR/FLOWMETER	1
		134 460	CONNECTOR, twlk insul male	1
		010 368	CLAMP, work 200A	1
		026 843	INSULATOR, vinyl black	2

+When ordering a component originally displaying a precautionary label, the label should also be ordered.
*Recommended Spare Parts.

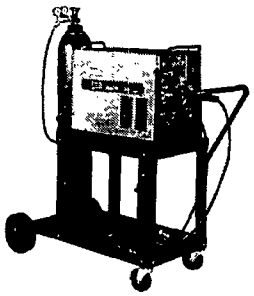
To maintain the factory original performance of your equipment, use only Manufacturer's Suggested Replacement Parts. Model and serial number required when ordering parts from your local distributor.

Notes

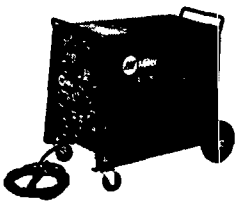
Options and Accessories

Econotig

6/96



Universal Carrying Cart and Cylinder Rack #042 934
This cart adds convenience to the Econotig package. The power source mounts securely to the top, and a cylinder rack supports the argon cylinder. The bottom tray can hold electrode leads or welding hood, gloves, etc. Cylinder rack will accommodate 6–9 in (152–228 mm) diameter, and 24–56 in (610–1422 mm) high cylinders. Also supports five standard TIG filler metal tubes and one Stick welding rod tube. Net shipping weight is 69 lbs (31 kg).



Caster Kit #042 811
Allows Econotig to be moved short distances. Does **not** include gas cylinder rack.

RCC-14 Remote Contactor and Current Control #151 086
Comes standard with 50 Hz units.
A fingertip control can be used instead of the supplied remote foot control. Useful when welding where a foot control cannot be used.

This rotary motion fingertip control fastens to TIG torch handle using two Velcro strips. Includes 28 ft (8.5 m) cord and plug. Allows complete current and contactor control.

RHC-14 Hand Control #129 340
Miniature hand control for remote current and contactor control. Dimensions: 4 in (102 mm) x 4 in (102 mm) x 3-1/4 in (82 mm). Includes 20 ft (6 m) cord and 14-pin plug.

RFC-14 Foot Control #129 339
Comes standard with 60 Hz units.
Heavy duty foot current and contactor control. Includes 20 ft (6 m) cord and 14-pin plug.

TRUE BLUE® WARRANTY

Effective January 1, 1997
(Equipment with a serial number preface of "KH" or newer)

This limited warranty supersedes all previous Miller warranties and is exclusive with no other guarantees or warranties expressed or implied.

LIMITED WARRANTY – Subject to the terms and conditions below, Miller Electric Mfg. Co., Appleton, Wisconsin, warrants to its original retail purchaser that new Miller equipment sold after the effective date of this limited warranty is free of defects in material and workmanship at the time it is shipped by Miller. THIS WARRANTY IS EXPRESSLY IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING THE WARRANTIES OF MERCHANTABILITY AND FITNESS.

Within the warranty periods listed below, Miller will repair or replace any warranted parts or components that fail due to such defects in material or workmanship. Miller must be notified in writing within thirty (30) days of such defect or failure, at which time Miller will provide instructions on the warranty claim procedures to be followed.

Miller shall honor warranty claims on warranted equipment listed below in the event of such a failure within the warranty time periods. All warranty time periods start on the date that the equipment was delivered to the original retail purchaser, or one year after the equipment is sent to a North American distributor or eighteen months after the equipment is sent to an International distributor.

1. 5 Years Parts – 3 Years Labor
   * Original main power rectifiers
   * Inverters (input and output rectifiers only)
2. 3 Years — Parts and Labor
   * Transformer/Rectifier Power Sources
   * Plasma Arc Cutting Power Sources
   * Semi-Automatic and Automatic Wire Feeders
   * Inverter Power Supplies
   * Intellitig
   * Robots
   * Engine Driven Welding Generators
     (NOTE: Engines are warranted separately by the engine manufacturer.)
3. 1 Year — Parts and Labor
   * Motor Driven Guns
   * Process Controllers
   * Positioners and Controllers
   * Automatic Motion Devices
   * Orbital Weld Heads
   * IHPS Power Sources
   * Water Coolant Systems
   * HF Units
   * Grids
   * Spot Welders
   * Load Banks
   * SDX Transformers
   * Miller Cyclomatic Equipment
   * Running Gear/Trailers
   * Plasma Cutting Torches (except APT, ZIPCUT & PLAZCUT Models)
   * Deutz Engines (outside North America)
   * Field Options
     (NOTE: Field options are covered under True Blue® for the remaining warranty period of the product they are installed in, or for a minimum of one year — whichever is greater.)
4. 6 Months — Batteries
5. 90 Days — Parts and Labor
   * MIG Guns/TIG Torches
   * APT, ZIPCUT & PLAZCUT Model Plasma Cutting Torches
   * Remote Controls
   * Accessory Kits
   * Replacement Parts (No labor)

Miller's True Blue® Limited Warranty shall not apply to:

1. Items furnished by Miller, but manufactured by others, such as engines or trade accessories. These items are covered by the manufacturer's warranty, if any.
2. Consumable components; such as contact tips, cutting nozzles, contactors, brushes, slip rings, relays or parts that fail due to normal wear.
3. Equipment that has been modified by any party other than Miller, or equipment that has been improperly installed, improperly operated or misused based upon industry standards, or equipment which has not had reasonable and necessary maintenance, or equipment which has been used for operation outside of the specifications for the equipment.

MILLER PRODUCTS ARE INTENDED FOR PURCHASE AND USE BY COMMERCIAL/INDUSTRIAL USERS AND PERSONS TRAINED AND EXPERIENCED IN THE USE AND MAINTENANCE OF WELDING EQUIPMENT.

In the event of a warranty claim covered by this warranty, the exclusive remedies shall be, at Miller's option: (1) repair; or (2) replacement; or, where authorized in writing by Miller in appropriate cases, (3) the reasonable cost of repair or replacement at an authorized Miller service station; or (4) payment of or credit for the purchase price (less reasonable depreciation based upon actual use) upon return of the goods at customer's risk and expense. Miller's option of repair or replacement will be F.O.B., Factory at Appleton, Wisconsin, or F.O.B. at a Miller authorized service facility as determined by Miller. Therefore no compensation or reimbursement for transportation costs of any kind will be allowed.

TO THE EXTENT PERMITTED BY LAW, THE REMEDIES PROVIDED HEREIN ARE THE SOLE AND EXCLUSIVE REMEDIES. IN NO EVENT SHALL MILLER BE LIABLE FOR DIRECT, INDIRECT, SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES (INCLUDING LOSS OF PROFIT), WHETHER BASED ON CONTRACT, TORT OR ANY OTHER LEGAL THEORY.

ANY EXPRESS WARRANTY NOT PROVIDED HEREIN AND ANY IMPLIED WARRANTY, GUARANTY OR REPRESENTATION AS TO PERFORMANCE, AND ANY REMEDY FOR BREACH OF CONTRACT TORT OR ANY OTHER LEGAL THEORY WHICH, BUT FOR THIS PROVISION, MIGHT ARISE BY IMPLICATION, OPERATION OF LAW, CUSTOM OF TRADE OR COURSE OF DEALING, INCLUDING ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR PARTICULAR PURPOSE, WITH RESPECT TO ANY AND ALL EQUIPMENT FURNISHED BY MILLER IS EXCLUDED AND DISCLAIMED BY MILLER.

Some states in the U.S.A. do not allow limitations of how long an implied warranty lasts, or the exclusion of incidental, indirect, special or consequential damages, so the above limitation or exclusion may not apply to you. This warranty provides specific legal rights, and other rights may be available, but may vary from state to state.

In Canada, legislation in some provinces provides for certain additional warranties or remedies other than as stated herein, and to the extent that they may not be waived, the limitations and exclusions set out above may not apply. This Limited Warranty provides specific legal rights, and other rights may be available, but may vary from province to province.

miller_warr 3/97

Warranty Questions?

Call 1-800-4-A-MILLER for your local Miller distributor.

Miller. *The Power of Blue.*

Owner's Record

Please complete and retain with your personal records.

Model Name	**Serial/Style Number**
Purchase Date	(Date which equipment was delivered to original customer.)
Distributor	
Address	
City	
State	**Zip**

Resources Available

Always provide Model Name and Serial/Style Number.

Contact your Distributor for: To locate distributor nearest you call 1-800-4-A-Miller.	Welding Supplies and Consumables Options and Accessories Personal Safety Equipment Service and Repair Replacement Parts Training (Schools, Videos, Books) Owner's Manuals Technical Manuals (Servicing Information and Parts) Circuit Diagrams Welding Process Handbooks
Contact the Delivering Carrier for: For assistance in filing or settling claims, contact your distributor and/or equipment manufacturer's Transportation Department.	File a claim for loss or damage during shipment.

Miller Electric Mfg. Co.
An Illinois Tool Works Company
1635 West Spencer Street
Appleton, WI 54914 USA

International Headquarters–USA
Phone: 414-734-9821
USA & Canada FAX: 414-735-4134
International FAX: 414-735-4125

European Headquarters –
United Kingdom
Phone: 44 (0) 1625-525566
FAX: 44 (0) 1625-537553

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